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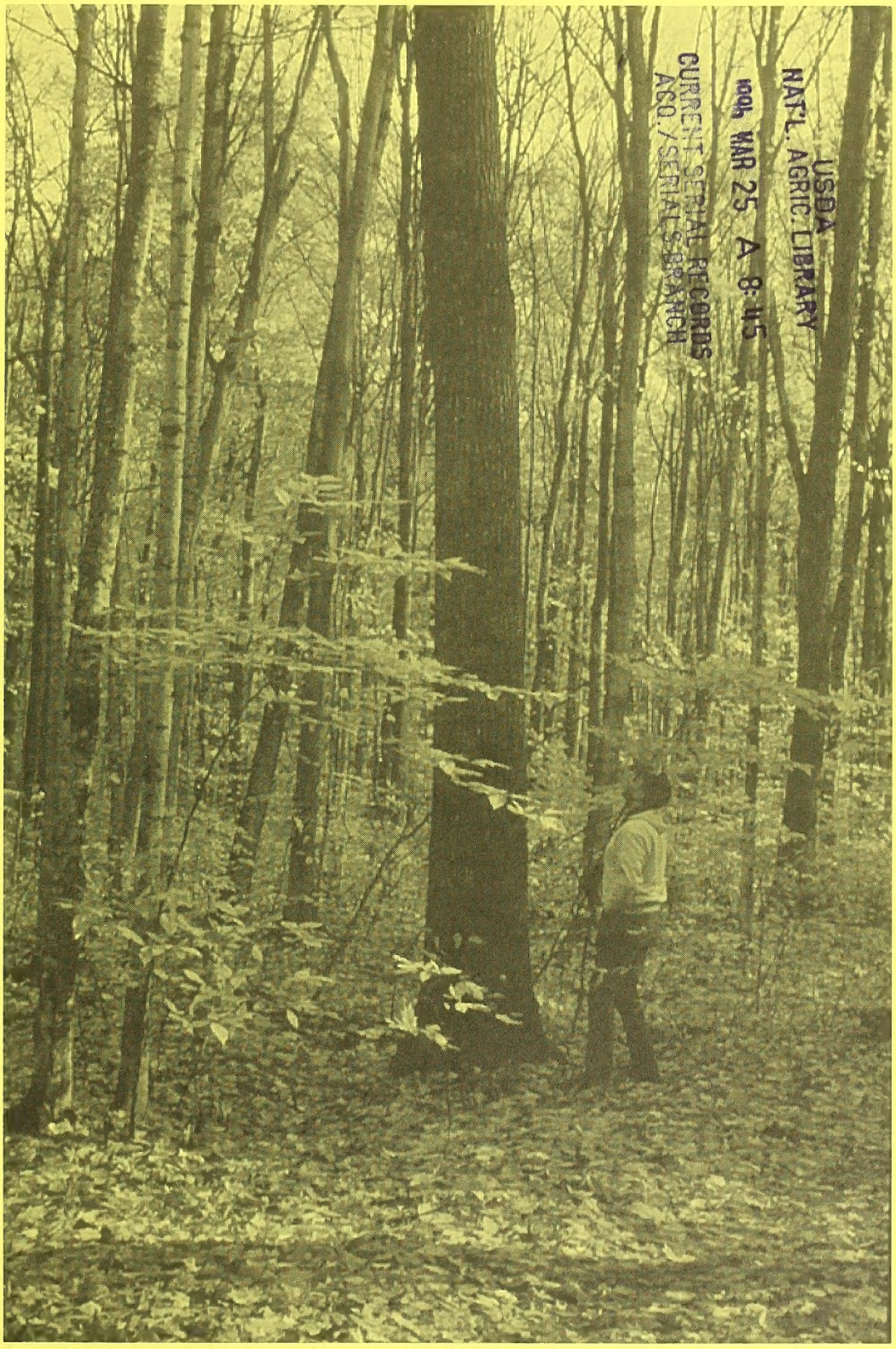
Resource Bulletin
NC-170

Michigan Forest Statistics, 1993

Earl C. Leatherberry and John S. Spencer, Jr.



North Central Forest Experiment Station
Forest Service—U.S. Department of Agriculture
1992 Folwell Avenue
St. Paul, Minnesota 55108
Manuscript approved for publication January 12, 1996
1996

This report includes the most commonly used Forest Inventory and Analysis statistics. Additional forest resource data can be provided. Persons requesting additional information from the raw inventory data are expected to pay the retrieval costs. These costs range from less than $100 for a relatively simple request to more than $2,000 for a complex retrieval involving the services of a Forest Inventory and Analysis computer programmer. Requests will be filled so as to minimize the impact on the Forest Inventory and Analysis Work Unit.

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FOREWORD

The fifth inventory of Michigan was directed by Neal Kingsley, Forest Inventory and Analysis (FIA) Program Manager, North Central Forest Experiment Station. Robin Bertsch, Forest Development Section Chief, Michigan Department of Natural Resources Forest Management Division, was responsible for all State contacts and activities during the inventory process. Jerold Hahn and Mark Hansen were responsible for inventory design. Jerry Ostrom supervised the FIA field staff. Beth Collins supervised FIA's photo interpretation staff.

FIA field staff members in Michigan were: Todd Anderson, Kristen Bailey, John Benaszeski, Michelle Benedict, Avery Beyer, Michael Burns, Charles Butler, Paul Castillo, Jeffrey Cronce, Paul Dashner, Mark Dilley, David Duwe, Jay Flynn, Rodney Fouks, Nathan Goodrich, Kevin Haustein, Cheri Hartless, Patrick Hartless, Robert Haukereid, Glenda Hefty, Thomas Huegerich, Jeffrey Hunteman, Gary Inhelder, Jason Jensen, Nicholas Kestle, Peter Koehler, Kyle Lombard, Mark Majewsky, Melissa Mantel, Richard McDonald, Paul McKenzie, Angela Milford, William Nelson, Eric Oliphant, William Peters, Ron Piva, Lawrence Plucinski, Theresa Reilly, Fritz Ritter, Brian Schweiss, Patrick Shinners, Gary Stachowicz, Richard Stanford, James Stelick, Jerry Van Cleve, Heidi Waymann, Kristen Weber, Linda Weidel, Brad Witkin, and Christopher Yonkers. FIA field staff clerk typists were: Monica Van Cleve and Erin Witkin.

FIA photo interpreters for the Michigan inventory were: Barb Andersen, Rose Berg, Beth Collins, John DuPlissis, Dan Groen, Dale Gormanson, Dave Haugen, Doug Hecker, Jennifer Iole, Barb Knight, Leo Larkin, Troy Lindgren, Doug Magee, John Muhich, Ron Piva, Mark Springen, and Dan Wendt.

Pat Miles and Mark Hansen were responsible for generating area, volume, growth, and removals tables. Dennis May, Ron Hackett, and Ron Piva, with assistance from Jack Pilon of the Michigan DNR, collected and compiled data on timber products output and timber removals. Barb Knight and Jay Solomakos edited the data, and Mary Jo Resendez prepared the tables for printing. Mary Jean Hanson, Barb Freund, and Dan Goodman provided administrative and secretarial support. Computer support was provided by Gerhard Raile.

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Michigan Forest Statistics, 1993

Earl C. Leatherberry and John S. Spencer, Jr.

HIGHLIGHTS

Note: *Data from new forest inventories are often compared with data from earlier inventories to determine trends in forest resources. However, for the comparisons to be valid, the procedures used in the two inventories must be similar. As a result of our ongoing efforts to improve the efficiency and reliability of the inventory, several changes in procedures and definitions have occurred since the last Michigan inventory in 1980. Because some of these changes will make it inappropriate to directly compare the 1993 data with those published for 1980, data from the 1980 inventory have been reprocessed using the 1993 procedures. Please refer to the section labeled "Comparing the Fifth Inventory of Michigan With the Fourth Inventory" for more details.*

General

Michigan's location and geography combine to form an ecological landscape that is diverse and in many ways unique. The State's two peninsulas—the Upper and Lower—support an association of biotic and environmental factors that forms diverse forest communities. Before settlement, what is now Michigan had an estimated 35.5 million acres of forest land (Chase *et al.* 1970). The forest landscape mostly reflected the gradients of climate and soils found throughout the State. For example, in the southern half of the Lower Peninsula, on well-drained upland soils, black oak, white oak, red maple, and shagbark hickory dominated. On the moist, but finer upland soils, sugar maple, beech, basswood, and red oak were prevalent. In areas near Lake Michigan, beech and maple were common. On muck, alluvial, or lake plain soils, ash, elm, silver and red maple, and swamp white oak were common (Sommers 1977). In the northern Lower Peninsula and the eastern Upper Peninsula, beech, maple, yellow birch, hemlock, and balsam fir dominated loamy upland soils, particularly near Lake Michigan. On the interior, drier sandy soils, large areas of pine were common. Black spruce and northern white-cedar were found on low, boggy sites. In the western Upper Peninsula, the rocky landscape supported sugar maple, basswood, red oak, yellow birch, and hemlock. Pockets of pines were scattered throughout the region (Sommers 1977).

The shape and structure of the original forest of Michigan were also affected by various natural disturbance regimes. Fire was the dominant natural disturbance in the oak-hickory forest of southern Michigan. Windstorms, such as tornadoes and "downburst," together with gaps in the overstory, were responsible for regenerating the beech-sugar maple forest (McNab and Avers 1994). In the pine forest of the northern Lower and the eastern Upper Peninsulas, catastrophic fires were more common, occurring about every 80 to 250 years. In the western Upper Peninsula, windfall played a role in shaping the northern hardwood forest (McNab and Avers 1994).

Before settlement, the forest extended over nearly 95 percent of the land that is now the State of Michigan. It was a diverse and dynamic forest that supported a myriad of associated flora and fauna. However, the early settlers viewed the forest as an impediment to development and as a source of raw material that would drive and sustain that development. The primary value of the forest to them was its timber resources. The original forest was estimated to contain about 10 million acres of

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prime pine and 9 million acres of high-quality northern hardwoods (Chase *et al.* 1970).

In the mid-1800's, the forest of Michigan began to undergo radical changes. White pine was cut extensively, and Michigan was the Nation's largest supplier of white pine lumber by the late 1800's. White pine and other timber products from Michigan's forests provided much of the wood products that went into building the urban centers of the Midwest. However, after about a century of extensive logging and clearing of land for agricultural production, the forest was reduced and left in a condition that hardly resembled the original forest. The first statewide forest inventory conducted in 1935 by the USDA Forest Service revealed that Michigan's original forest area had been nearly halved, to about 19 million acres.

Forest land in the southern Lower Peninsula was mostly in small woodlots where many of the high-quality northern hardwood trees had been removed. The northern half of the Lower Peninsula had the greatest acreage of "deforested" land of any region in the Lake States (Cunningham and Moser 1938). In most of the northern Lower Peninsula, logging, subsequent fires, and land converting naturally back to forest changed the composition of the forest. In most areas where white and red pines once stood, early sucessional species, such as paper birch, trembling and bigtooth aspen, red maple and, jack pine took over. A few remnant stands of old white pine provided a glimpse of what the original white pine forest probably looked like. Hartwick Pines State Park near Grayling is a good example. Tree-planting programs in the northern Lower Peninsula resulted in scattered tracts of red pine. Only in the Upper Peninsula were there areas of forested land that contained many sawtimber size trees. Some stands of old sugar maple, yellow birch, hemlock, basswood, and elm closely resembled their presettlement counterparts.

After the first statewide inventory in 1935 (U.S. Department of Agriculture 1936), other inventories were conducted in 1955 (Findell *et al.* 1960), 1966 (Chase *et al.* 1970), 1980 (Spencer 1983, Spencer and Hahn 1984), and the most recent one in 1993. From the first inventory to the current one, Michigan's forest land has continued to recover from the period of exploitation, and the quality of timber produced has continued to improve. Like the original forest, the present forest landscape is a reflection of climate and soils; however, forest management practices have played an important role in the condition of the present forest. In fact, it is largely because of improved forest management practices that the area of forest land has remained fairly constant since 1935, while supporting an expanding forest industry and providing other values, such as recreation and wildlife habitat.

This report presents in highlight form some major findings from the 1993 forest inventory of Michigan's forest land, with comparisons to the 1980 inventory. Provided is an overview of forest land area, with emphasis placed on timberland area, volume, growth, mortality, and removals. (See Appendix, Definition of Terms, for definitions of terms used in this report.)

Area

- The 1993 inventory revealed 19.3 million acres of forest land in Michigan. Forest land accounts for about half (53 percent) of the State's 36.4 million acres of land. Between 1980 and 1993, forest land in Michigan increased by 933 thousand acres, or by 5 percent. For inventory and analysis purposes, Michigan is divided into four Survey Units (fig. 1). In the Eastern Upper Peninsula and the Western Upper Peninsula Survey Units, about 8 of every 10 acres of land is forested. In the Northern Lower Peninsula Survey Unit, about 6 of every 10 acres is forested. In the Southern Lower Peninsula Survey Unit, forest land is sparse and more fragmented, with less than 2 of every 10 acres forested.

- More than half a million acres (574.7 thousand acres) of forest land in Michigan is classified as reserved forest land, on which timber harvesting is not permitted. The majority of reserved forest land (350.5 thousand acres) is in the two Upper Peninsula Survey Units. Much of the reserved forest land in the Upper Peninsula is in the Ottawa and Hiawatha National Forests, Isle Royale National Park, and Pictured Rocks National Lakeshore.

- In 1993 there were 18.6 million acres of timberland in Michigan, an increase of 1.1 million acres from the 17.5 million acres in 1980, or a 7-percent gain. More than 90 percent of the increase occurred in the Lower Peninsula. Some of the increase was due to

Figure 1.—*Forest Survey Units in Michigan, 1993.*

abandoned cropland and pasture reverting back to timberland, and some was due to unproductive land (nontimberland) being reclassified as marginally productive timberland. Timberland area amounts to 97 percent of the forest land in Michigan.

- Individuals are the predominant timberland owner group in Michigan; they own 46 percent (8.4 million acres) of the State's timberland area. Various governmental agencies administer 35 percent (6.6 million acres) of Michigan's timberland—the majority by State government (20 percent) and the USDA Forest Service (14 percent). Corporate owners (corporations not in the business of operating primary wood-using plants) own 11 percent (2.1 million acres), and forest industry owns 8 percent (1.5 million acres) of Michigan's timberland area (fig. 2). Indian tribal groups and other federal agencies, combined, own less than 1 percent (64.2 thousand acres) of the State's timberland.

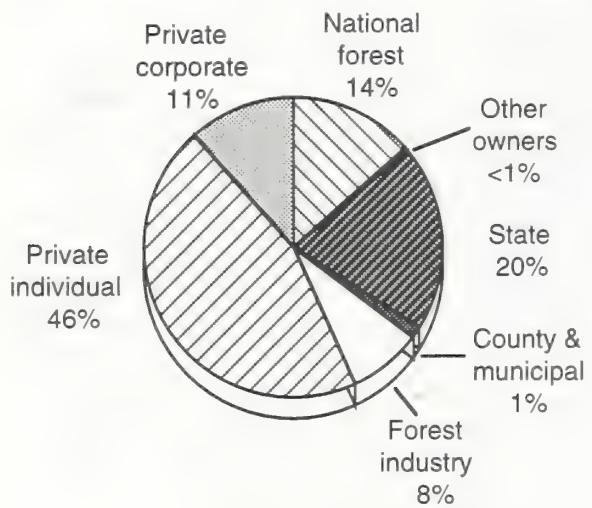

Figure 2.—*Timberland ownership by ownership class, Michigan, 1993.*

- The pattern of timberland ownership differs by Survey Unit. Although only 8 percent of the State's timberland is owned by forest industry, virtually all of that (99.6 percent) is located in the Upper Peninsula Survey Units—the majority in the Western Upper Peninsula Unit. In the Upper Peninsula Units and the Northern Lower Peninsula Unit, more than one-third of the timberland is in public ownership. Individuals and corporations own most of the timberland in the two Lower Peninsula Survey Units. For example, in the Northern Lower Peninsula Survey Unit, 59 percent of the timberland area is owned by individuals and corporations. A significant proportion of the corporate-owned timberland is used primarily for recreation, especially hunting. In the Southern Lower Peninsula Unit, individuals own 80 percent of the timberland area.

- Michigan's timberland area grows mostly hardwood trees. Hardwood forest types occupy three-fourths (13.9 million acres) of the timberland area. The maple-beech-birch forest type group is the dominant type group in Michigan, occupying 38 percent (7.2 million acres) of the timberland area. The aspen-birch forest type group ranks second in area, occupying 17 percent of the timberland area (3.2 million acres); followed by the spruce-fir type group with 14 percent (2.7 million acres); the white-red-jack pine types group and the oak-hickory type group, each with 11 percent (2 million acres each); and the elm-ash-soft maple type group at 9 percent (1.6 million acres) (fig. 3). (Note: Table 3, in the Appendix, breaks down the area of forest types into local forest types.)

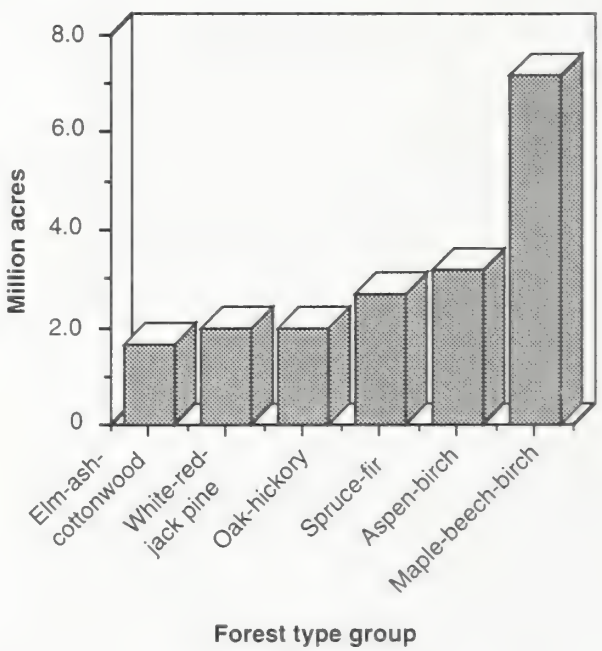

Figure 3.—*Area of timberland by forest type group, Michigan, 1993.*

- The maple-beech-birch and the aspen-birch forest types groups occupy extensive areas in

all Survey Units, except in the Southern Lower Peninsula Unit, where the aspen-birch forest type occupies only 5 percent of the timberland area. The oak-hickory type is found almost exclusively in the Northern and Southern Lower Peninsula Units. In the Northern Lower Peninsula Unit, this type contains only a small number of hickory trees. White-red-jack pine types are found mostly in the Northern Lower Peninsula Unit (61 percent). Most (78 percent) of the area in the spruce-fir forest type is in the Eastern and Western Upper Peninsula Units.

- Stocking on timberland areas continues to improve. In 1980, approximately 89 percent of the timberland area was moderately stocked to overstocked with growing-stock trees. By 1990 this had increased to 93 percent.

- The area of sawtimber stands on timberland increased from 5.5 million acres in 1980 to 8.6 million acres in 1993, as poletimber stands grew into the sawtimber size class. Between inventories, area in poletimber stands declined by 26 percent. The increase in sawtimber-size stands and the corresponding decline in poletimber-size stands show the continuing maturation of stands in Michigan. The area of sapling-seedling stands stayed at about one-fourth of the State's timberland area (fig. 4).

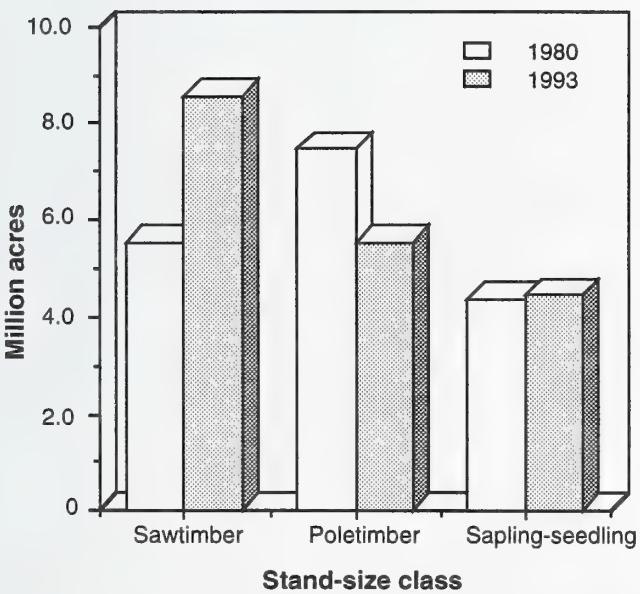

Figure 4.—*Area of timberland by stand-size class, Michigan, 1980 and 1993.*

Number of Trees

- The number of growing-stock trees 5 inches and larger in diameter totaled 3.1 billion, an increase of nearly 15 percent from that reported in 1980. The number of trees between 1 and 5 inches in diameter decreased by about 10 percent between 1980 (8.1 billion) and 1993 (7.2 billion). In general, the diameter of the average tree in Michigan grew larger between inventories. In 1993, 9 percent of the trees were 9 inches in diameter and larger, compared to 6 percent in 1980.

Volume

- Volume of growing stock increased from 19.7 to 26.6 billion cubic feet between 1980 and 1993, a 35-percent gain, as average tree size continued to increase. Hardwoods accounted for 72 percent of the 1993 volume, and softwoods accounted for 28 percent.

- Sawtimber volume increased from 45.5 to 71.0 billion board feet[1] between inventories, a 56-percent gain.

- Growing-stock volume is greatest in the Northern Lower Peninsula (10.1 billion cubic feet), followed by the Western Upper Peninsula (7.2 billion), the Eastern Upper Peninsula (5.1 billion), and the Southern Lower Peninsula (4.2 billion). Volume increased between inventories at the fastest rate in the Southern Lower Peninsula (63 percent), followed by the Northern Lower Peninsula (46 percent), the Eastern Upper Peninsula (24 percent), and the Western Upper Peninsula (18 percent).

- Average growing-stock volume per acre increased from 1,130 cubic feet in 1980 to 1,431 cubic feet in 1993.

- Hard maple had the largest volume of growing stock in both 1980 and 1993 (2.8 billion and 4.0 billion cubic feet, respectively) (figs. 5 and 6). Soft maple ranked second in 1993 with 3.5 billion cubic feet, moving up from third place in 1980. Aspen ranked third in 1993 with 3.2 billion cubic feet, after having ranked second in 1980.

[1] *International 1/4-inch rule.*

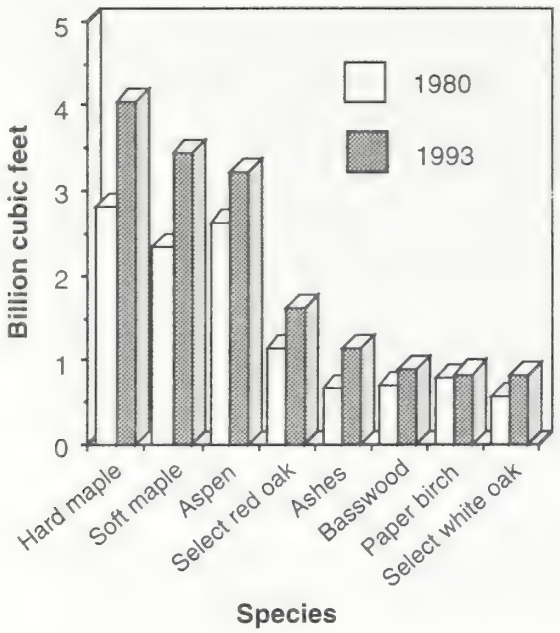

Figure 5.—*Net volume of hardwood growing stock on timberland, by species group, Michigan, 1980 and 1993.*

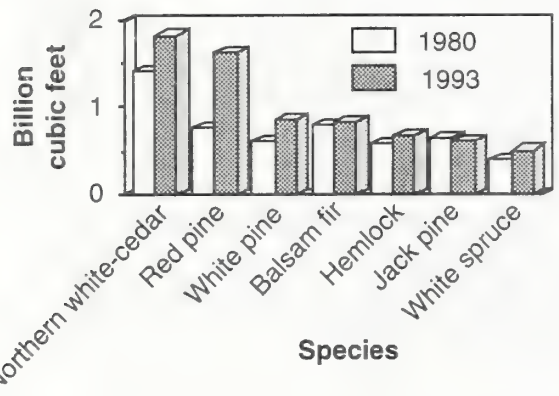

Figure 6.—*Net volume of softwood growing stock on timberland, by species group, Michigan, 1980 and 1993.*

- The largest volume of growing stock is in trees in the 8- and 10-inch diameter classes (fig. 7). Sixty-four percent of the volume is in trees 12 inches in diameter and smaller. About 7 percent of the total volume is in trees 22 inches in diameter and larger.

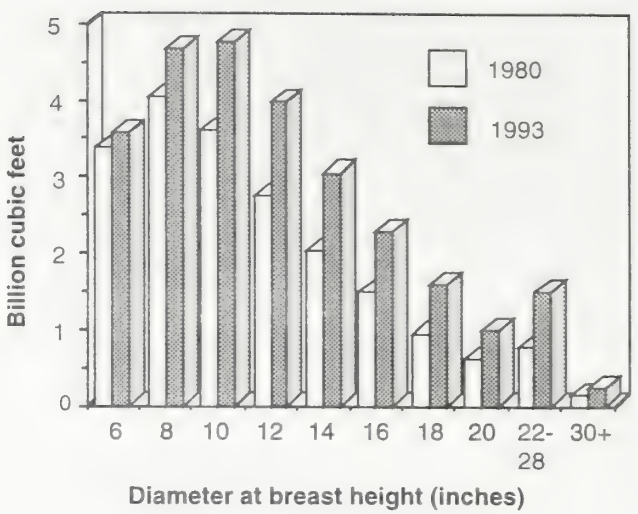

Figure 7.—*Net volume of growing stock on timberland by diameter class, Michigan, 1980 and 1993.*

- The volume of growing stock is largest in the maple-beech-birch forest type, where it accounts for 44 percent of the total, followed by the aspen type (12 percent), the oak-hickory type (11 percent), the elm-ash-soft maple type (8 percent), and the northern white-cedar type (8 percent).

- Sixty-seven percent of the growing-stock volume is held by private owners. Forty-six percent of the volume is owned by private individuals (fig. 8).

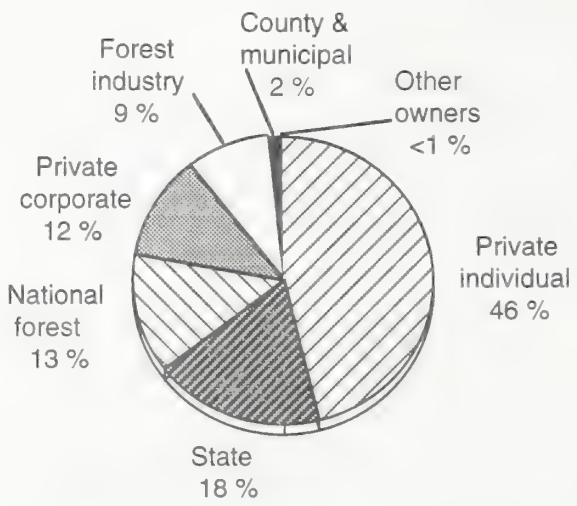
Forest industry 9 %
County & municipal 2 %
Other owners <1 %
Private corporate 12 %
Private individual 46 %
National forest 13 %
State 18 %

Figure 8.—*Net volume of growing stock on timberland by owner class, Michigan, 1993.*

- Hard maple accounted for 23 percent of all hardwood sawtimber volume graded as the best quality tree grade, followed by select red oak with 17 percent.

- In addition to the 26.6 billion cubic feet of growing stock, 2.9 billion cubic feet of sound volume is in rough (1.6 billion), short-log (0.6 billion), rotten (0.5 billion), and salvable dead (0.2 billion) trees.

Growth

- Net annual growth of growing stock on timberland in 1992 (current year growth) was 825.0 million cubic feet (3.1 percent of inventory), compared with 604.9 million cubic feet in 1979 (3.1 percent of inventory). Average growing-stock growth per acre amounted to 44 cubic feet in 1992, compared with 35 cubic feet in 1979.

- Net annual growth of growing stock on timberland averaged 760.4 million cubic feet from 1980 to 1992.

- Potential net annual growth of growing stock for the State is roughly estimated to be 1,170 million cubic feet or 63 cubic feet per acre. This represents a 42-percent increase over the 1992 net annual growth.

- Net annual growth of sawtimber on timberland in 1992 was 3.1 billion board feet (4.3 percent of inventory), compared with 1.8 billion board feet in 1979 (3.9 percent of inventory). Average sawtimber growth per acre amounted to 165 board feet in 1992, compared with 100 board feet in 1979.

- Net annual growth of sawtimber on timberland averaged 2.7 billion board feet from 1980 to 1992.

Removals

- Annual timber removals from growing stock in 1992 amounted to 360.5 million cubic feet (1.4 percent of inventory), compared with 274.6 million in 1979 (1.4 percent of inventory), a 31-percent increase.

- Total removals in 1992 (360.5 million cubic feet) consisted of 307.2 million cubic feet of removals for roundwood products (85 percent), 31.0 million cubic feet of logging residue (9 percent), and 22.3 million cubic feet of other removals (6 percent). By comparison, the 1979 total removals (274.6 million cubic feet) consisted of 223.0 million cubic feet of removals for roundwood products (81 percent), 16.8 million cubic feet of logging residue (6 percent), and 34.8 million cubic feet of other removals (13 percent).

- Annual timber removals from growing stock averaged 274.3 million cubic feet from 1980 to 1992.

- Timber removals from growing stock in 1992 represented 44 percent of net annual growth, compared with 45 percent in 1979 (fig. 9).

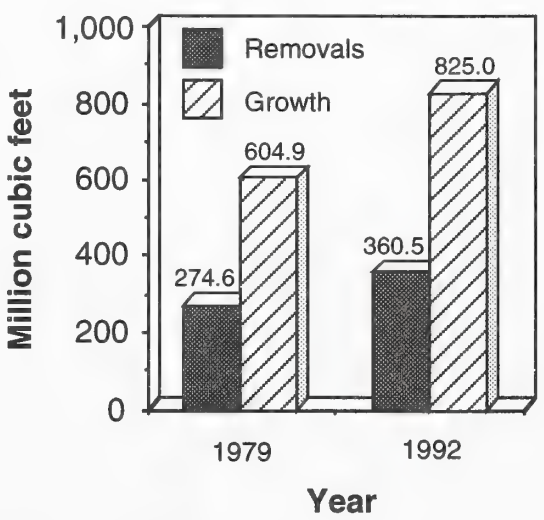

Figure 9.—*Comparison of the volumes of annual timber removals with net annual growth, Michigan, 1979 and 1992.*

- Annual timber removals from sawtimber in 1992 amounted to 1,100.6 million board feet (1.6 percent of inventory), compared with 915.5 million board feet in 1979 (2.0 percent of inventory).

- Average annual sawtimber removals from 1980 to 1992 was 776.5 million board feet, indicating that removals for both 1979 and 1992 were greater than the average for the period.

Mortality

- Growing-stock mortality amounted to 200.4 million cubic feet in 1992, or 0.8 percent of

inventory. Mortality averaged 198.5 million cubic feet each year between 1980 and 1992.

- Mortality of sawtimber totaled 470.2 million board feet in 1992, or 0.7 percent of inventory. Mortality averaged 436.0 million board feet each year between inventories.

- Twenty-six percent of the average annual growing-stock mortality volume was aspen (1.6 percent of its inventory). Other species with large volumes of mortality included balsam fir (3.2 percent of its inventory), elm (5.1 percent), jack pine (1.9 percent), and paper birch (1.3 percent).

- Disease is responsible for 58 percent of the average annual growing-stock mortality for which a cause of death could be determined, followed by weather (21 percent), insects (8 percent), human-caused (6 percent), animals (4 percent), and others (3 percent).

Biomass

- Total biomass of all live trees at least 1 inch d.b.h. on timberland amounted to 1.5 billion green tons, an average of 80 green tons per acre. The greatest biomass is from the boles of growing-stock trees larger than 5 inches d.b.h. (57 percent), from the tops and limbs of growing-stock trees larger than 5 inches d.b.h. (16 percent), and from all live trees 1 to 5 inches d.b.h. (12 percent).

APPENDIX

ACCURACY OF THE SURVEY

Forest Inventory and Analysis information is based on a sampling procedure designed to provide reliable statistics at the State and Survey Unit levels. Consequently, the reported figures are estimates only. A measure of reliability of these figures is given by sampling errors. These sampling errors mean that the chances are two out of three that if a 100-percent inventory had been taken, using the same methods, the results would have been within the limits indicated.

For example, the estimated growing-stock volume in the State in 1993, 26,644.9 million cubic feet, has a sampling error of ±0.67 percent (±178.5 million cubic feet). The growing-stock volume from a 100-percent inventory would be expected to fall between 26,823.4 and 26,466.4 million cubic feet (26,644.9 ± 178.5), there being a one in three chance that this is not the case.

The following tabulation shows the State total sampling errors for the Michigan forest inventory:

Item	State totals	Sampling error
Growing stock	(Million cubic feet)	(Percent)
Volume (1993)	26,644.9	0.67
Average annual growth (1980-1992)	760.4	0.91
Average annual removals (1980-1992)	274.3	4.02
Sawtimber	(Million board feet)	
Volume (1993)	70,971.2	0.94
Average annual growth (1980-1992)	2,665.2	1.06
Average annual removals (1980-1992)	776.5	4.73
	(Thousand acres)	
Timberland area (1993)	18,615.9	0.34

As survey data are broken down into sections smaller than State totals, the sampling error increases. For example, the sampling error for timberland area in a particular county is higher than that for total timberland area in the State. To estimate sampling error for data smaller than State totals, use the following formula:

$$E = \frac{(SE)\sqrt{(\text{State total volume or area})}}{\sqrt{(\text{Volume or area smaller than State total})}}$$

Where :

E = Sampling error in percent.

SE = State total error for volume or area.

For example, to compute the error on the area of timberland in the maple-beech-birch type for the State, proceed as follows:

1) The total area of maple-beech-birch type in the State from table 3 = 7,161.3 thousand acres.

2) The total area of all timberland in the State from table 3 = 18,615.9 thousand acres.

3) The State total error for timberland area from the above tabulation = 0.34 percent.

4) Using the above formula:

$$E = \frac{.0034\sqrt{18,615.9}}{\sqrt{7,161.3}}$$

E = .0055 or 0.55 percent - - sampling error for the maple - beech - birch forest type in Michigan.

County Data

A standard FIA inventory is designed to provide sampling errors of no more than 3 percent per million acres of timberland or an overall error on Michigan's nearly 18,616 million acres of about 0.7 percent. More accurate survey information was obtained during this survey than otherwise would have been feasible because of intensified field sampling. Sampling intensity was increased from a single intensity level to a triple intensity level in the Eastern and Western Upper Peninsula Units, increased from a single intensity level to a double intensity level in the Northern Lower Peninsula Unit, and kept at a single intensity level in the Southern Lower Peninsula Unit. The goal was to provide a sampling error of less than 10 percent for total timberland area by county in the Units intensified. Such sampling was made possible through the cooperation, assistance, and additional funding provided by the State of Michigan and Michigan forest industries and associations. In addition, to aid in determining current timber removals, the Michigan Department of Natural Resources surveyed primary wood-using plants in the State. Sampling errors for area, volume, growth, and removals for both growing stock and sawtimber are shown in table 79 for each county in Michigan.

The sampling error within a county depends on county size and total area of timberland. Many large, heavily forested counties in the State have sampling errors well below 5 percent. However, in counties where timberland area is less than 35,000 acres, the sampling error for the total area in timberland will generally exceed 10 percent. The sampling error for total timber volume in a reporting area containing 35,000 acres of timberland will be about 20 percent.

COMPARING THE FIFTH INVENTORY OF MICHIGAN WITH THE FOURTH INVENTORY

A new volume estimation procedure was developed for the Lake States (see Survey Procedures section), and this procedure was used to compute the 1992 volumes and to recompute the 1980 volume for growth calculations. Although the adjustment will differ by Survey Unit and species, the recomputed 1980 growing-stock and sawtimber volumes will generally be greater than those shown in the 1980 report.

Past surveys used only growing-stock trees to determine stand-size class. Current survey procedures require that stand-size class be determined on the basis of all live trees. Therefore, direct comparisons of current inventory data to old inventory data by stand-size class may be misleading.

The basic building block for estimating forest area and timber volume has been changed from the Survey Unit to the county. In the past, the statistics were developed at the Unit level and prorated back to the county on the basis of photo-interpretation points. Direct development of county-level data helps users interested in more precise local data, but can make the outcome of comparisons with past estimates imprecise.

SURVEY PROCEDURES

The 1993 Michigan survey used a growth model-enhanced, two-phase sample design. Using this sampling scheme and associated estimators is similar to sampling with partial replacement (SPR), in that a set of randomly located plots is available for remeasurement and a random set of new plots is established and measured. A significant feature of the new Michigan design is stratification for disturbance on the old sample and use of a growth model to improve regression estimates made on old undisturbed forest plots (fig. 10). Detailed descriptions of the sampling and estimation procedures are presented by Hansen (1990). The growth model used in the Michigan survey design was the Lake States Stand and Tree Evaluation and Modeling System (STEMS) (Belcher *et al.* 1982).

Major Steps in the New Survey Design

1. Aerial photography (Phase 1)

In this phase, two sets of random points were located on current aerial photography. The first is a set of new photo plots and the second is a set of relocated old ground plot locations from the 1980 inventory. Aerial photographs used were black and white infrared taken in 1986 at a scale of 1:15,840 (nominal). These photographs were purchased by the Michigan DNR and loaned to the Forest Service. The locations of the plots used in the 1980 inventory were transferred to these new photographs. The photographs were then assembled into township mosaics, and a systematic grid of 121 one-acre photo plots (each plot representing approximately 190.4 acres) was overlaid on each township mosaic. Each of these photo plots was examined by aerial photo interpretation specialists and classified stereoscopically based on land use. If trees were present, forest type and stand-size/density class were recorded. After this examination, all the old "disturbed" sample locations and one-third of the old "undisturbed" forested plots were sent to the field for survey crews to verify the photo classification and to take further measurements. All photo plot locations for the 1993 inventory were examined and were classified as shown in the tabulation on the next page.

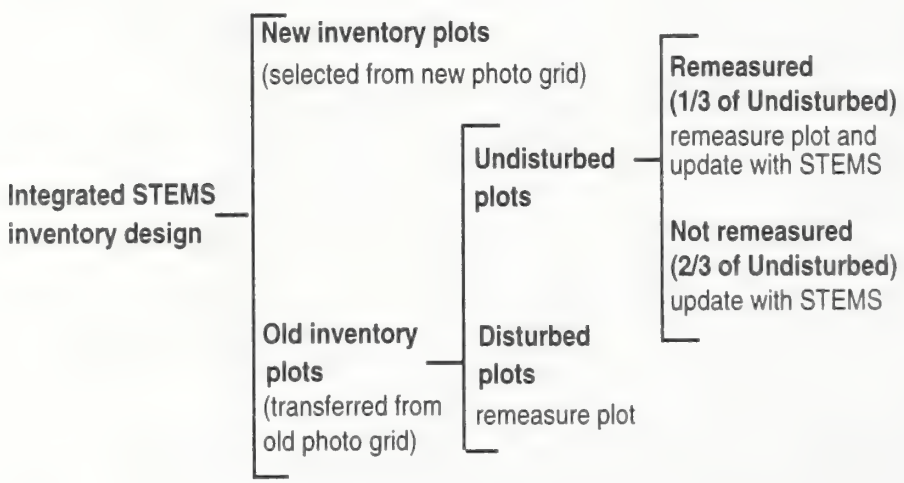

Figure 10.—*Overview of the Michigan sample design.*

Photo land class	Photo plots
Timberland	97,851
Reserved forest land	2,512
Other forest land	1,014
Questionable	3,036
Nonforest with trees	7,438
Nonforest reserved	471
Nonforest without trees	79,425
Water	5,204
All classes	196,951

2. Plot measurements (Phase 2)

On plots classified as timberland, wooded pasture, or windbreak (at least 120 feet wide), a ground plot was established, remeasured, or modeled. Old plots sent to the field for remeasurement that could not be relocated were replaced with a new plot at the approximate location of the old one. Each ground plot consisted of a 10-point cluster covering approximately 1 acre. At each point, trees 5.0 inches or more in d.b.h. were sampled on a 37.5 Basal Area Factor (BAF) variable-radius plot, and trees less than 5.0 inches d.b.h. were sampled on a 1/300-acre fixed-radius plot. The measurement procedures for the new and old sample locations were as follows:

a) New inventory plots

A systematic sample of the new photo plots was selected for field measurement. Ground plots were established, and measures of current classification such as land use, forest type, and ownership as well as size and condition of all trees on the plot were recorded. These locations were monumented for future remeasurement.

b) Old inventory plots

These plots were established, monumented, and measured as part of the 1980 field inventory. The procedures for these old plots were different from those for the new plots. Old plots were classed as "undisturbed" or "disturbed" in the aerial photo phase of the sampling process. All disturbed plots and a one-third sample of the undisturbed plots were remeasured to obtain estimates of current condition and changes since the last inventory. All trees measured on these plots in 1980 were remeasured or otherwise accounted for, and all new trees were identified and measured.

All sample plots that were forested at the time of the 1980 inventory and determined to be undisturbed until this inventory were projected to the current time using STEMS. This procedure gives projected estimates of current volume and growth for these undisturbed plots. The comparison of the projected and observed values on the one-third sample of the undisturbed forest plots that were remeasured provided local calibration data to adjust the projected values of the undisturbed plots that were not remeasured. The adjustment procedure is a modified version of the method described by Smith (1983).

The undisturbed forested plots that were not remeasured play a crucial role in the new survey design. These plots, after careful examination comparing past and current aerial photography, were determined to be undisturbed and had conditions that could be simulated by STEMS. The STEMS growth model was used to "grow" the old plot and tree data to produce an estimate of current data. Thus, these plots were treated as ground plots, even though they were never visited. The plot record for each modeled plot was sent to the field for verification of current ownership information.

All old plots classified as disturbed were sent to the field for remeasurement to assess and verify changes since the last inventory. Disturbance refers to any change on a plot that can be detected on aerial photos and that the STEMS growth processor cannot predict, such as catastrophic mortality, cutting, seedling stands, and land use change.

The estimation procedure for computing statistics from this sampling design was more complicated than the simple two-phase estimation procedure used in the past. In fact, this procedure yielded two independent samples, one coming from the new photo points and the other from the old photo points that are remeasured or modeled. The tabulation on the next page summarizes the distribution of all ground plots for the new inventory design by type of plot:

Ground land use class	Old plots remeasured	Old plots updated	New plots	Dropped or denied access	Total plots
Timberland	4,180	4,021	2,023	2	10,226
Reserved forest land	87	3	472	0	562
Other forest land	46	1	16	1	64
Nonforest with trees	372	148	147	1	668
Nonforest without trees	1,997	3,254	1,160	1	6,412
Water	99	304	154	37	594
Other	0	0	0	58	58
Total	6,781	7,731	3,972	100	18,584

3. Area estimates

Area estimates were made using two-phase estimation methods. In this type of estimation, a preliminary estimate of area by land use is made from the aerial photographs (Phase 1) and corrected by the plot measurements (Phase 2). A complete description of this estimation method is presented by Loetsch and Haller (1964).

4. Volume estimates

Estimates of volume per acre were made from the trees measured or modeled on the 10-point plots. Estimates of volume per acre were multiplied by the area estimates to obtain estimates of total volume. Net cubic foot volumes are based on a modification of the method presented by Hahn (1984) for use in the Lake States. For the Michigan inventory, the merchantable height equation presented in Hahn (1984) was used in conjunction with Stone's equation (see Appendix I in Hahn, 1984) to estimate gross volume. This estimate was then corrected by species for variation in bark and cull volume to yield an estimate of net volume, using the coefficients presented in Hahn (1984).

The Forest Service reports all board foot volume in International 1/4-inch rule. In Michigan, the Scribner log rule is commonly used. Scribner log rule conversion factors were derived from full tree measurements taken throughout the Lake States (Michigan, Wisconsin, and Minnesota) and an equation developed by Wiant and Castenaeda (1977). The factors (multipliers) used to convert board foot International volumes to the Scribner rule are shown in the following tabulation:

D.b.h. (inches)	Scribner rule conversion factor	
	Softwoods	Hardwoods
9.0-10.9	0.7830	—
11.0-12.9	.8287	0.8317
13.0-14.9	.8577	.8611
15.0-16.9	.8784	.8827
17.0-18.9	.8945	.8999
19.0-20.9	.9079	.9132
21.0-22.9	.9168	.9239
23.0-24.9	.9240	.9325
25.0-26.9	.9299	.9396
27.0-28.9	.9321	.9454
29.0+	.9357	.9544

5. Growth and mortality estimates

On remeasured plots, estimates of growth and mortality per acre come from the remeasured diameters of trees and from observation of trees that died between inventories. Growth reported as the average net annual growth between the two inventories (1980 and 1993) is computed from data on remeasurement plots and modeled plots using methods presented by Van Deusen *et al.* (1986). Mortality is also average net annual for the remeasurement period. On new plots, where trees were not remeasured, estimates of growth and mortality were obtained by using STEMS to project the growth and mortality of trees for 1 year. Growth and mortality estimates for old undisturbed plots that were updated were derived in the same manner as remeasured plots. The STEMS growth model was adjusted by Survey Unit to meet local conditions, using data from the undisturbed remeasurement plots. As with volume, total growth and mortality estimates were obtained by multiplying the per acre estimates by area estimates. Current annual growth for 1992 was computed by using the adjusted STEMS model to grow all current inventory plots for 1 year.

6. Average annual removals estimates

Average annual growing-stock and sawtimber removals (1980 to 1992) were estimated only from the remeasured plots; new plots and STEMS-projected plots were not used to estimate removals. These estimates are obtained from trees measured in the last survey and cut or otherwise removed from the timberland base. Because remeasurement plots make up about one-half of the total ground plots, average annual removals estimates have greater sampling errors than volume and growth estimates.

Tree and Log Grades

Log grades and tree grades are based on the classification of external characteristics as indicators of quality. Log grades and or tree grades were taken on approximately one-third of the sample plots in Michigan. All sawtimber softwood sample trees were graded for quality and assigned a butt log grade. All sawtimber hardwood sample trees were graded for quality and assigned a tree grade. The volume yield by log grade or tree grade for this sample was used to distribute the volume of the ungraded sample trees by species group.

Hardwood sawtimber trees were graded according to "Hardwood Tree Grades for Factory Lumber" (Hanks 1976). The best 12-foot section of the lowest 16-foot hardwood log was used for grading. Hardwood sawtimber trees that did not meet minimum tree grade specifications for grades 1 through 3 were assigned grade 4 according to Forest Service standard specifications for hardwood construction logs described in "A Guide to Hardwood Log Grading" (Rast *et al.* 1973).

Red pine and jack pine sawtimber trees were graded based on specifications described in "Forest Service Log Grades for Southern Pines" (Campbell 1964). White pine and other softwood sawtimber trees were graded according to specifications described by Ostrander and Brisbin (1971). For all softwoods, the first merchantable 16-foot log, or shorter lengths down to 12 feet, was used for grading.

Hardwood Tree Grade for Factory Lumber [a]

Grade factor	Tree grade 1	Tree grade 2	Tree grade 3
Length of grading zone (feet)	Butt 16	Butt 16	Butt 16
Length of grading section [b] (feet)	Best 12	Best 12	Best 12
D.b.h., minimum (inches)	16[c]	13	11
D.i.b., minimum at top of grading section (inches)	13[c] 16 20	11[d] 12	8
Clear cuttings (on the 3 best faces)[e]			
Length, minimum (feet)	7 5 3	3 3	2
Number on face (maximum)	2	2 3	Unlimited
Yield in face length (minimum)	5/6	4/6	3/6
Cull deduction (including crook and sweep, but excluding shake) maximum within grading section (percent)	9	9[f]	50

[a] Hanks (1976).

[b] Whenever a 14- or 16-foot section of the butt 16-foot log is better than the best 12-foot section, the grade of the longer section will become the grade of the tree. This longer section, when used, is the basis for determining the grading factors such as diameter and cull deduction.

[c] In basswood and ash, d.i.b. at top of grading section must be 12 inches and d.b.h. must be 15 inches.

[d] Grade 2 trees can be 10 inches d.i.b. at top of grading section if they otherwise meet surface requirements for small grade 1's.

[e] A clear cutting is a portion of a face free of defects, extending the width of the face. A face is one-fourth of the surface of the grading section as divided lengthwise.

[f] Fifteen percent crook and sweep or 40 percent total cull deduction are permitted in grade 2 trees, if size and surface of grading section qualify as grade 1. If rot shortens the required clear cuttings to the extent of dropping the butt log to grade 2, do not drop the tree's grade to 3 unless the cull deduction for rot is greater than 40 percent.

Forest Service Standard Grades for Hardwood Factory Saw Logs [a]

Grading Factors		Log Grades								
		Log grade 1			Log grade 2				Log grade 3
Position in tree		Butts only	Butts & uppers		Butts & uppers				Butts & uppers
Scaling diameter (inches)		13-15[b]	16-19	20+	11+[c]			12+	8+
Length without trim (feet)		10+			10+	8-9	10-11	12+	8+
Required clear cuttings[d] of each of three best faces [e]	Minimum length, feet	7	5	3	3				2
	Maximum number	2			2	2	2	3	No limit
	Minimum proportion of log length required in clear cutting	5/6			2/3	3/4	2/3	2/3	1/2
Maximum sweep & crook allowance (percent)	For logs with less than one-fourth of end in sound defects	15			30				50
	For logs with more than one-fourth of end in sound defects	10			20				35
Maximum scaling deduction (percent)		40 [f]			50 [g]				50

[a] Rast *et al.* (1973).
[b] Ash and basswood butts can be 12 inches if they otherwise meet requirements for small #1's.
[c] Ten-inch logs of all species can be #2 if they otherwise meet requirements for small #1's.
[d] A clear cutting is a portion of a face, extending the width of the face, that is free of defects.
[e] A face is one-fourth of the surface of the log as divided lengthwise.
[f] Otherwise #1 logs with 41-60 percent deductions can be #2.
[g] Otherwise #2 logs with 51-60 percent deductions can be #3.

Forest Service Standard Specifications for Hardwood Construction Logs (tie and timber logs) [a, b]

Position in tree	Butts and uppers
Minimum diameter, small end	8 inches
Minimum length without trim	8 feet
Clear cuttings	No requirements
Sweep allowance	One-fourth of the diameter at the small end for each 8 feet of length.
Sound surface defects:	
Single knots	Any number, if no one knot has an average diameter above the callus in excess of one-third of the log diameter at point of occurrence.
Whorled knots	Any number, if the sum of knot diameters above the callus does not exceed one-third of the log diameter at point of occurrence.
Holes	Any number, provided none has a diameter over one-third of the log diameter at point of occurrence and none extends more than 3 inches into included timber[c].
Unsound surface defects:	Same requirements as for sound defects if they extend into included timber. No limit if they do not.

[a] Rast *et al.* (1973).

[b] These specifications are minimum for the class. If, from a group of logs, factory logs are selected first, thus leaving only nonfactory logs from which to select construction logs, then the quality range of the construction logs so selected is limited, and the class may be considered a grade. If selection for construction logs is given first priority, it may be necessary to subdivide the class into grades.

[c] Included timber is always square, and dimension is judged from small end.

Eastern White Pine Saw Log Grade Specifications [a]

Grading factor	Log grade 1	Log grade 2	Log grade 3	Log grade 4
1. Minimum scaling diameter (inches)	14[b]	6	6	6
2. Minimum log length (feet)	10[c]	8	8	8
3. Maximum weevil injury (number)	None	None	2 injuries [d]	No limit
4. Minimum face requirements	Two full length or four 50%[e] length good faces (in addition, log knots on balance of faces shall not exceed size limit of grade 2 logs).	**NO GOOD FACES REQUIRED** Maximum diameter of log knots on three best faces: **SOUND RED KNOTS** not to exceed 1/6 scaling diameter and 3" maximum / not to exceed 1/3 scaling diameter and 5" maximum **OVERGROWN/DEAD/BLACK KNOTS** not to exceed 1/12 scaling diameter and 1 1/2" max. / not to exceed 1/6 scaling diameter and 2 1/2" max.		Includes all logs not qualifying for No. 3 or better and have at least 1/3 of their gross volume in sound wood suitable for manufacture into standard lumber
5. Maximum sweep or crook (percent)	20	30	40	66 2/3
6. Maximum total scaling deduction (percent)	50	50	50	66 2/3

After the tentative log grade is established from face examination, the log will be reduced in grade whenever the following defects are evident:

7. Conks, punk knots, and pine borer damage on bark surface. [f]
   Degrade one grade if present on one face.
   Degrade two grades if present on two faces.
   Degrade three grades if present on three or more faces.

8. Log end defects: red rot, ring shake, heavy stain, and pine borer damage outside the heart center of log. [f] Consider log as having a total of 8 quarters (4 on each end) and degrade as indicated.
   Degrade one grade if present in 2 quarters of log ends.
   Degrade two grades if present in 3 or 4 quarters of log ends.
   Degrade three grades if present in 5 or more quarters of log ends.

a. Ostrander and Brisbin (1971).
b. Twelve- and 13-inch logs with four full-length good faces are acceptable.
c. Eight-foot logs with four full-length good faces are acceptable.
d. Eight-foot Number 3 logs limited to one weevil injury.
e. Minimum 50% length good face must be at least 6 feet.
f. Factors 7 and 8 are not cumulative (total degrade based on more serious of the two). No log is to be degraded below grade 4 if net scale is at least one-third of gross scale.

Log Grades for Jack Pine and Red Pine [a]

Grade 1: Trees with three or four clear faces on the 16-foot grading section.[b]
Grade 2: Trees with one or two clear faces on the 16-foot grading section.
Grade 3: Trees with no clear faces on the 16-foot grading section.

After the tentative grade is established from above, the tree will be reduced one grade for each of the following, except that no tree can be reduced below grade 3, provided the total scaling deductions for sweep and/or rot do not exceed two-thirds of the gross scale of the tree.

Sweep. Degrade any tentative grade 1 or 2 tree one grade if sweep in the lower 12 feet of grading sections amounts to 3 or more inches and equals or exceeds one-fourth of the diameter at breast height.

Heart rot. Degrade any tentative grade 1 or 2 tree one grade if conk, punk knots, massed hyphae, or other evidence of advanced heart rot is found anywhere on the main tree stem.

[a] Campbell (1964).

[b] A face is one-fourth of the circumference in width extending full length of the grading section. Clear faces are those free of: knots measuring more than one-half inch in diameter, overgrown knots of any size, and holes more than one-fourth inch in diameter. Faces may be rotated to obtain the maximum number of clear on the grading section.

Log Grades for All Other Softwood Logs

Grade 1

1. Trees must be 16 inches in diameter or larger, grading section 12 feet in length or longer, and with deduction for defect not over 30 percent of gross scale.

2. Trees must be at least 75 percent clear on each of three faces.

3. All knots outside clear cutting must be sound and not more than 2-1/2 inches in size.

Grade 2

1. Trees must be 12 inches in diameter or larger, grading section 12 feet in length or longer, and with a net scale after deduction for defect of at least 50 percent of the gross scale deducted for defect.

2. Trees must be at least 50 percent clear on each of three faces or 75 percent clear on two faces.

Grade 3

1. Trees must be 6 inches in diameter or larger, grading section 12 feet in length or longer, and with a net scale after deduction for defect of at least 50 percent of the gross contents of the log.

Note: Diameters are diameter inside bark (d.i.b.) at small end of grading section. Percent clear refers to percent clear in one continuous section.

METRIC EQUIVALENTS OF UNITS USED IN THIS REPORT

1 acre = 4,046.86 square meters or 0.405 hectare.
1,000 acres = 405 hectares.
1 cubic foot = 0.0283 cubic meter.
1 foot = 30.48 centimeters or 0.3048 meter.
1 inch = 25.4 millimeters, 2.54 centimeters, or 0.0254 meter.
1 pound = 0.454 kilograms.
1 ton = 0.907 metric tons.

TREE SPECIES GROUPS IN MICHIGAN

(Species names are based on Little, 1981)

SOFTWOODS

Eastern white pine ..... *Pinus strobus*
Red pine ..... *Pinus resinosa*
Jack pine ..... *Pinus banksiana*
White spruce ..... *Picea glauca*
Black spruce ..... *Picea mariana*
Balsam fir ..... *Abies balsamea*
Eastern hemlock ..... *Tsuga canadensis*
Tamarack ..... *Larix laricina*
Northern white-cedar ..... *Thuja occidentalis*
Other softwoods
- Eastern redcedar ..... *Juniperus virginiana*
- Norway spruce ..... *Picea abies*
- Engelmann spruce ..... *Picea engelmannii*
- Austrian pine ..... *Pinus nigra*
- Scotch pine ..... *Pinus sylvestris*
- Ponderosa pine ..... *Pinus ponderosa*
- Blue spruce ..... *Picea pungens*
- Douglas fir ..... *Pseudotsuga menziesii*

HARDWOODS

Select white oaks[2]
- White oak ..... *Quercus alba*
- Bur oak ..... *Quercus macrocarpa*
- Chinkapin oak ..... *Quercus muehlenbergii*
- Swamp white oak ..... *Quercus bicolor*

Other white oaks[2]
- Chestnut oak ..... *Quercus prinus*

Select red oak[2]
- Northern red oak ..... *Quercus rubra*

Other red oaks[2]
- Scarlet oak ..... *Quercus coccinea*
- Northern pin oak ..... *Quercus ellipsoidalis*
- Pin oak ..... *Quercus palustris*
- Black oak ..... *Quercus velutina*

Hickories[2]
- Shagbark hickory ..... *Carya ovata*
- Shellbark hickory ..... *Carya laciniosa*
- Bitternut hickory ..... *Carya cordiformis*
- Mockernut hickory ..... *Carya tomentosa*
- Pignut hickory ..... *Carya glabra*

Hard maples[2]
- Black maple ..... *Acer nigrum*
- Sugar maple ..... *Acer saccharum*

Soft maples[3]
- Red maple ..... *Acer rubrum*
- Silver maple ..... *Acer saccharinum*

American beech[2] ..... *Fagus grandifolia*
Ashes
- White ash[2] ..... *Fraxinus americana*
- Black ash[3] ..... *Fraxinus nigra*
- Green ash[2] ..... *Fraxinus pennsylvanica*

Balsam poplar[3] ..... *Populus balsamifera*
Aspens[3]
- Bigtooth aspen ..... *Populus grandidentata*
- Quaking aspen ..... *Populus tremuloides*

Eastern cottonwood[3] ..... *Populus deltoides*
American basswood[3] ..... *Tilia americana*
Yellow-poplar[3] ..... *Liriodendron tulipifera*
Black walnut[2] ..... *Juglans nigra*
Black cherry[3] ..... *Prunus serotina*
Butternut[3] ..... *Juglans cinerea*
Sycamore[3] ..... *Platanus occidentalis*
Elms
- American elm[3] ..... *Ulmus americana*
- Siberian elm[3] ..... *Ulmus pumila*
- Slippery elm[3] ..... *Ulmus rubra*
- Rock elm[2] ..... *Ulmus thomasii*

Birches[3]
- Yellow birch ..... *Betula alleghaniensis*
- River birch ..... *Betula nigra*
- Paper birch ..... *Betula papyrifera*

Hackberry[3] ..... *Celtis occidentalis*
Black willow[3] ..... *Salix nigra*
Black tupelo[3] ..... *Nyssa sylvatica* var. *sylvatica*
Other hardwoods
- Boxelder[3] ..... *Acer negundo*
- Sweet birch[3] ..... *Betula lenta*
- Black locust[2] ..... *Robinia pseudoacacia*
- Red mulberry[3] ..... *Morus rubra*
- Honeylocust[2] ..... *Gleditsia triacanthos*
- Northern catalpa[2] ..... *Catalpa speciosa*
- Ohio buckeye[3] ..... *Aesculus glabra*
- Flowering dogwood[2] ..... *Cornus florida*
- Sassafras[3] ..... *Sassafras albidum*

Noncommercial species
- Striped maple ..... *Acer pensylvanicum*
- Mountain maple ..... *Acer spicatum*
- Ailanthus ..... *Ailanthus altissima*
- American hornbeam ..... *Carpinus caroliniana*
- Hawthorn ..... *Crataegus* spp.

[2] *This species or species group is considered a hard hardwood, with an average specific gravity greater than or equal to 0.50.*

[3] *This species or species group is considered a soft hardwood, with an average specific gravity of less than 0.50.*

Osage-orange ..... *Maclura pomifera*
Apple ..... *Malus* spp.
Eastern hophornbeam ..... *Ostrya virginiana*
Pincherry ..... *Prunus pensylvanica*
Wild plum ..... *Prunus* spp.
Chokecherry ..... *Prunus virginiana*
Peachleaf willow ..... *Salix amygdaloides*
Diamond willow ..... *Salix bebbiana*
American mountain ash ..... *Sorbus americana*

DEFINITION OF TERMS

Average annual mortality of growing stock.—The average cubic foot volume of sound wood in growing-stock trees that died in 1 year. Average annual mortality is the average for the years between inventories (1980 to 1992 in this report).

Average annual mortality of sawtimber.—The average board foot volume of sound wood in sawtimber trees that died in 1 year. Average annual mortality is the average for the years between inventories (1980 to 1992 in this report).

Average annual removals from growing stock.—The average net growing-stock volume in growing-stock trees removed annually for roundwood forest products, in addition to the volume of logging residues, and the volume of other removals. Average annual removals of growing stock are the average for the years between inventories (1980 to 1992 in this report) and are based on information obtained from remeasurement plots (see Survey Procedures in Appendix).

Average annual removals from sawtimber.—The average net board foot sawtimber volume of live sawtimber trees removed annually for roundwood forest products, in addition to the volume of logging residues, and the volume of other removals. Average annual removals of sawtimber are the average for the years between inventories (1980 to 1992 in this report) and are based on information obtained from remeasurement plots (see Survey Procedures in Appendix).

Average net annual growth of growing stock.—The annual change in cubic foot volume of sound wood in live sawtimber and poletimber trees, and the total volume of trees entering these classes through ingrowth, less volume losses resulting from natural causes. Average net annual growing stock is the average for the years between inventories (1980 to 1992 in this report).

Average net annual growth of sawtimber.—The annual change in the board foot volume of live sawtimber trees, and the total volume of trees reaching sawtimber size, less volume losses resulting from natural causes. Average net annual growth of sawtimber is the average for the years between inventories (1980 to 1992 in this report).

Basal area.—Tree area in square feet of the cross section at breast height of a single tree. When the basal areas of all trees in a stand are summed, the result is usually expressed as square feet of basal area per acre.

Biomass.—The aboveground volume of all live trees (including bark but excluding foliage) reported in green tons (i.e., green weight). Biomass has four components:

Bole.—Biomass of a tree from 1 foot above the ground to a 4-inch top outside bark.

Tops and limbs.—Total biomass of tree from a 1-foot stump minus the bole.

1- to 5-inch trees.—Total aboveground biomass of a tree from 1 to 5 inches in diameter at breast height.

Stump.—Biomass of a tree 5 inches d.b.h. and larger from the ground to a height of 1 foot.

Commercial species.—Tree species presently or prospectively suitable for industrial wood products. (Note: Excludes species of typically small size, poor form, or inferior quality such as hophornbeam, Osage-orange, and redbud.)

Cord.—One standard cord is 128 cubic feet of stacked wood, including bark and air space. Cubic feet can be converted to solid wood standard cords by dividing by 79.

Corporate.—Lands owned by a private corporation not in the business of operating primary wood-using plants.

County and municipal land.—Land owned by counties and local public agencies or municipalities, or land leased to these governmental units for 50 years or more.

Cropland.—Land under cultivation within the last 24 months; including cropland harvested,

crop failures, cultivated summer fallow, idle cropland used only for pasture, orchards, and land in soil improvement crops, but excluding land cultivated in developing improved pasture.

Cull.—Portions of a tree that are unusable for industrial wood products because of rot, missing or dead material, form, or other defect.

Current annual growth of growing stock.—The annual change in volume of sound wood in live sawtimber and poletimber trees, and the total volume of trees entering these classes through ingrowth, less volume losses resulting from natural causes, reported for a single year (1992 in this report). Current growth is based on an estimate of the current annual increment of each growing-stock tree in the inventory.

Current annual growth of sawtimber.—The annual change in the volume of live sawtimber trees, and the total volume of trees reaching sawtimber size, less volume losses resulting from natural causes, reported for a single year (1992 in this report). Current growth is based on an estimate of the current annual increment of each growing-stock tree in the inventory.

Current annual removals from growing stock.—The current net growing-stock volume in growing-stock trees removed annually for roundwood forest products, in addition to the volume of logging residues, and the volume of other removals. Current annual removals of growing stock are reported for a single year (1992 in this report); they are based on a survey of primary wood processing mills to determine removals for products and on information from remeasurement plots (see Survey Procedures in Appendix) to determine removals due to land use change.

Current annual removals from sawtimber.—The current net board foot sawtimber volume of live sawtimber trees removed annually for roundwood forest products, in addition to the volume of logging residues, and the volume of other removals. Current annual removals of sawtimber are reported for a single year (1992 in this report); they are based on a survey of primary wood processing mills to determine removals for products and on information from remeasurement plots (see Survey Procedures in Appendix) to determine removals due to land use change.

Diameter class.—A classification of trees based on diameter outside bark, measured at breast height 4.5 feet above the ground. (Note d.b.h. is the common abbreviation for diameter at breast height.) Two-inch diameter classes are commonly used in Forest Inventory and Analysis, with the even inch the approximate midpoint for a class. For example, the 6-inch class includes trees 5.0 through 6.9 inches d.b.h.

Diameter at breast height (d.b.h.).—The outside bark diameter at 4.5 feet (1.37 m) above the forest floor on the uphill side of the tree. For determining breast height, the forest floor includes the duff layer that may be present, but does not include unincorporated woody debris that may rise above the ground line.

Farm.—Any place from which $1,000 or more of agricultural products were produced and sold during the year.

Farmer-owned land.—(See Individual private land.)

Forest industry land.—Land owned by companies or individuals operating primary wood-using plants.

Forest land.—Land at least 16.7 percent stocked by forest trees of any size, or formerly having had such tree cover, and not currently developed for nonforest use. (Note: Stocking is measured by comparing specified standards with basal area and/or number of trees, age or size, and spacing.) The minimum area for classification of forest land is 1 acre. Roadside, streamside, and shelterbelt strips of timber must have a crown width of at least 120 feet to qualify as forest land. Unimproved roads and trails, streams, or other bodies of water or clearings in forest areas shall be classed as forest if less than 120 feet wide. (See Tree, Land, Timberland, Reserved forest land, Other forest land, Stocking, and Water.)

Forest type.—A classification of forest land based on the species forming a plurality of live tree stocking. Major forest types in the State are:

Jack pine.—Forests in which jack pine comprises a plurality of the stocking. (Common associates include eastern white pine, red pine, aspen, birch, and maple.)

Red pine.—Forests in which red pine comprises a plurality of the stocking. (Common associates include eastern white pine, jack pine, aspen, birch, and maple.)

White pine.—Forests in which eastern white pine comprises a plurality of the stocking. (Common associates include red pine, jack pine, aspen, birch, and maple.)

Balsam fir.—Forests in which balsam fir and white spruce comprise a plurality of the stocking, with balsam fir the most common. (Common associates include aspen, maple, birch, northern white-cedar, and tamarack.)

White spruce.—Forests in which white spruce and balsam fir comprise a plurality of the stocking, with white spruce the most common. (Common associates include aspen, maple, birch, northern white-cedar, and tamarack.)

Black spruce.—Forests in which swamp conifers comprise a plurality of the stocking, with black spruce the most common. (Common associates include tamarack and northern white-cedar.)

Northern white-cedar.—Forests in which swamp conifers comprise a plurality of the stocking, with northern white-cedar the most common. (Common associates include tamarack and black spruce.)

Tamarack.—Forests in which swamp conifers comprise a plurality of the stocking, with tamarack the most common. (Common associates include black spruce and northern white-cedar.)

Oak-hickory.—Forests in which northern red oak, white oak, bur oak, or hickories, singly or in combination, comprise a plurality of the stocking. (Common associates include jack pine, elm, and maple.)

Elm-ash-soft maple.—Forests in which lowland elm, ash, red maple, silver maple, and cottonwood, singly or in combination, comprise a plurality of the stocking. (Common associates include birches, spruce, and balsam fir.)

Maple-beech-birch.—Forests in which sugar maple, yellow birch, upland American elm, and red maple, singly or in combination, comprise a plurality of the stocking. (Common associates include white pine, elm, and basswood.)

Aspen.—Forests in which quaking aspen or bigtooth aspen, singly or in combination, comprise a plurality of the stocking. (Common associates include balsam poplar, balsam fir, and paper birch.)

Paper birch.—Forests in which paper birch comprises a plurality of the stocking. (Common associates include maple, aspen, and balsam fir.)

Balsam poplar.—Forests in which balsam poplar comprises a plurality of the stocking. (Common associates include aspen, elm, and ash.)

Growing-stock tree.—A live tree of commercial species that meets specified standards of size, quality, and merchantability. (Note: Excludes rough, rotten, and dead trees.)

Growing-stock volume.—Net volume in cubic feet of growing-stock trees 5.0 inches d.b.h. and over, from 1 foot above the ground to a minimum 4.0-inch top diameter outside bark of the central stem or to the point where the central stem breaks into limbs.

Hard hardwoods.—Hardwood species with an average specific gravity greater than 0.50 such as oaks, hard maple, hickories, and ash.

Hardwoods.—Dicotyledonous trees, usually broad-leaved and deciduous. (See Soft hardwoods and Hard hardwoods.)

Improved pasture.—Land currently improved for grazing by cultivating, seeding, irrigating, or clearing trees or brush and less than 16.7 percent stocked with trees.

Indian land.—Land held in trust by the United States for tribes or individual Indians.

Individual private land.—Privately owned land not owned by forest industry. This class includes the formerly used Farmer and Miscellaneous private classes.

Industrial wood.—All roundwood products except residential fuelwood.

Land.—*A. Bureau of the Census.* Dry land and land temporarily or partly covered by water such as marshes, swamps, and river flood plains (omitting tidal flats below mean high tide); streams, sloughs, estuaries, and canals less than one-eighth of a statute mile wide; and lakes, reservoirs, and ponds less than 40 acres in area.

B. Forest Inventory and Analysis. The same as the Bureau of the Census, except minimum width of streams, etc., is 120 feet and minimum size of lakes, etc., is 1 acre.

Live trees.—Growing-stock, rough, and rotten trees 1.0 inch d.b.h. and larger.

Log grade.—A log classification based on external characteristics as indicators of quality or value. Log grade was assigned to a sample of softwood sawtimber trees throughout the State during the 1993 inventory. Also see Tree grade. (See Appendix for specific grading factors used.)

Logging residue.—The unused portions of cut trees, plus unused trees killed by logging.

Marsh.—Nonforest land that characteristically supports low, generally herbaceous or shrubby vegetation, and that is intermittently covered with water.

Merchantable.—Refers to a pulpwood or saw-log section that meets pulpwood or saw-log specifications, respectively.

Miscellaneous Federal land.—Federal land other than National Forest and land administered by the Bureau of Land Management or Bureau of Indian Affairs.

Miscellaneous private land.—(See Individual private land.)

National Forest land.—Federal land that has been legally designated as National Forest or purchase units, and other land administered by the USDA Forest Service.

Net volume.—Gross volume less deductions for rot, sweep, or other defect affecting use for timber products.

Noncommercial species.—Tree species of typically small size, poor form, or inferior quality that normally do not develop into trees suitable for industrial wood products.

Nonforest land.—Land that has never supported forests, and land formerly forested where use for timber management is precluded by development for other uses. (Note: Includes areas used for crops, improved pasture, residential areas, city parks, improved roads of any width and adjoining clearings, powerline clearings of any width, and 1- to 40-acre areas of water classified by the Bureau of the Census as land.) If intermingled in forest areas, unimproved roads and nonforest strips must be more than 120 feet wide and more than 1 acre in area to qualify as nonforest land.

a. Nonforest land without trees.—Nonforest land with no live trees present.

b. Nonforest land with trees.—Nonforest land with one or more trees per acre at least 5 inches d.b.h.

Nonstocked land.—Timberland less than 16.7 percent stocked with all live trees.

Other forest land.—Forest land not capable of producing 20 cubic feet per acre per year of industrial wood crops under natural conditions and not associated with urban or rural development. Many of these sites contain tree species that are not currently utilized for industrial wood production or trees of poor form, small size, or inferior quality that are unfit for most industrial products. Unproductivity may be the result of adverse site conditions such as sterile soil, dry climate, poor drainage, high elevation, and rockiness. This land is not withdrawn from timber utilization.

Other removals.—Growing-stock trees removed but not utilized for products, or trees left standing but "removed" from the timberland classification by land use change. Examples are removals from cultural operations such as timber stand improvement work and land clearing, and the standing volume on land classified originally as timberland but later designated as reserved from timber harvesting (such as a newly established State park).

Ownership size class.—The amount of timberland owned by one owner, regardless of the number of parcels.

Pasture.—Land presently used for grazing or under cultivation to develop grazing.

Physiographic class.—A measure of soil and water conditions that affect tree growth on a site. The physiographic classes are:

Xeric sites.—Very dry soils where excessive drainage seriously limits both growth and species occurrence. Example: sandy jack pine plains.

Xeromesic sites.— Moderately dry soils where excessive drainage limits growth and species occurrence to some extent. Example: dry oak ridge.

Mesic sites.—Deep, well-drained soils. Growth and species occurrence are limited only by climate. Example: well-drained terraces of loamy soil.

Hydromesic sites.— Moderately wet soils where insufficient drainage or infrequent flooding limits growth and species occurrence to some extent. Example: moderately drained bottomland hardwood sites.

Hydric sites.—Very wet sites where excess water seriously limits both growth and species occurrence. Example: frequently flooded river bottoms and black spruce swamps.

Plant byproducts.—Plant residues used for products such as mulch, pulp chips, and fuelwood.

Plantation.—An artificially reforested area sufficiently productive to qualify as timberland. The planted species is not necessarily predominant. Christmas tree plantations, which are considered reserved forest land, are not included.

Plant residues.—Wood and bark materials generated at manufacturing plants during production of other products.

Poletimber stand.—(See Stand-size class.)

Poletimber tree.—A live tree of commercial species at least 5.0 inches d.b.h., but smaller than sawtimber size.

Potential productivity class.—A classification of forest land in terms of inherent capacity to grow crops of industrial wood. The class identifies the potential growth in merchantable cubic feet/acre/year at culmination of mean annual increment of fully stocked natural stands.

Reserved forest land.—Forest land withdrawn from timber utilization through statute, administrative regulation, designation, or exclusive use for Christmas tree production, as indicated by annual shearing.

Rotten tree.—Live trees of commercial species that do not contain at least one 12-foot saw log or two saw logs 8 feet or longer, now or prospectively, and/or do not meet regional specifications for freedom from defect primarily because of rot; that is, when more than 50 percent of the cull volume in a tree is rotten.

Rough tree.—(a) Live trees of commercial species that do not contain at least one merchantable 12-foot saw log or two saw logs 8 feet or longer, now or prospectively, and/or do not meet regional specifications for freedom from defect primarily because of roughness or poor form, and (b) all live trees of noncommercial species.

Roundwood products.—Logs, bolts, or other round sections (including chips from roundwood) cut from trees for industrial or consumer uses. (Note: Includes saw logs, veneer logs, and bolts; cooperage logs and bolts; pulpwood; fuelwood; pilings; poles; posts; hewn ties; mine timbers; and various other round, split, or hewn products.)

Salvable dead tree.—A standing or down dead tree considered merchantable by regional standards.

Sapling.—A live tree 1.0 to 5.0 inches d.b.h.

Sapling-seedling stand.—(See Stand-size class.)

Saw log.—A log meeting minimum standards of diameter, length, and defect, including logs at least 8 feet long, sound and straight and with a minimum diameter outside bark (d.o.b.) for softwoods of 7.0 inches (9.0 inches for hardwoods) or other combinations of size and defect specified by regional standards.

Saw-log portion.—That part of the bole of sawtimber trees between the stump and the saw-log top.

Saw-log top.—The point on the bole of sawtimber trees above which a saw log cannot be produced. The minimum saw-log top is 7.0 inches d.o.b. for softwoods and 9.0 inches d.o.b. for hardwoods.

Sawtimber stand.—(See Stand-size class.)

Sawtimber tree.—A live tree of commercial species containing at least a 12-foot saw log or two noncontiguous saw logs 8 feet or longer, and meeting regional specifications for freedom from defect. Softwoods must be at least 9.0 inches d.b.h. Hardwoods must be at least 11.0 inches d.b.h.

Sawtimber volume.—Net volume of the saw-log portion of live sawtimber in board feet, International 1/4-inch rule (unless specified otherwise), from stump to a minimum 7.0 inches top d.o.b. for softwoods and a minimum 9.0 inches top d.o.b. for hardwoods.

Seedling.—A live tree less than 1.0 inch d.b.h. that is expected to survive. Only softwood seedlings more than 6 inches tall and hardwood seedlings more than 1 foot tall are counted.

Short-log (rough tree).—A sawtimber-size tree of commercial species that contains at least one merchantable 8- to 11-foot saw log but not a 12-foot saw log.

Shrub.—A woody, perennial plant differing from a perennial herb in its persistent and woody stem(s) and less definitely from a tree in its lower stature and/or the general absence of a well-defined main stem. For this report, shrubs were separated somewhat arbitrarily into tall and low shrubs as follows:

Tall shrubs.—Shrubs normally taller than 1.6 to 3.2 feet.

Low shrubs.—Shrubs normally shorter than 1.6 to 3.2 feet. (Woody perennial vines, such as grape, were included with low shrubs.)

Shrub and tree seedling biomass.—The total aboveground weight of trees less than 1.0 inch in diameter and all shrubs.

Site index.—An expression of forest site quality based on the height of a free-growing dominant or codominant tree of a representative species in the forest type at age 50.

Soft hardwoods.—Hardwood species with an average specific gravity less than 0.50, such as cottonwood, red maple, basswood, and willow.

Softwoods.—Coniferous trees, usually evergreen, having needles or scale-like leaves.

Stand.—A group of trees on a minimum of 1 acre of forest land that is stocked by forest trees of any size.

Stand-age class.—A classification based on age of the main stand. Main stand refers to trees of the dominant forest type and stand-size class.

Stand-size class.—A classification of stocked (see Stocking) forest land based on the size class of live trees on the area; that is, sawtimber, poletimber, or seedlings and saplings.

Sawtimber stands.—Stands with half or more of live tree stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

Poletimber stands.—Stands with half or more of live tree stocking in poletimber and/or sawtimber trees, and with poletimber stocking exceeding that of sawtimber.

Sapling-seedling stands.—Stands with more than half of the live tree stocking in saplings and/or seedlings.

State land.—Land owned by the State of Michigan or leased to it for 50 years or more.

Stocking.—The degree of occupancy of land by live trees, measured by basal area and/or the number of trees in a stand by size or age and spacing, compared to the basal area and/or number of trees required to fully utilize the growth potential of the land; that is, the stocking standard. A stocking percent of 100 indicates full utilization of the site and is equivalent to 80 square feet of basal area per acre in trees 5.0 inches d.b.h. and larger. In a stand of trees less than 5 inches d.b.h., a stocking percent of 100 would indicate that the present number of trees is sufficient to produce 80 square feet of basal area per acre when the trees reach 5 inches d.b.h.

Stands are grouped into the following stocking classes:

Overstocked stands.—Stands in which stocking of live trees is 133.0 percent or more.

Fully stocked stands.—Stands in which stocking of live trees is from 100.0 to 132.9 percent.

Medium stocked stands.—Stands in which stocking of live trees is from 60.0 to 99.9 percent.

Poorly stocked stands.—Stands in which stocking of live trees is from 16.7 to 59.9 percent.

Nonstocked areas.—Timberland on which stocking of live trees is less than 16.7 percent.

Timber products output.—All timber products cut from roundwood and byproducts of wood manufacturing plants. Roundwood products

include logs, bolts, or other round sections cut from growing-stock trees, cull trees, salvable dead trees, trees on nonforest land, noncommercial species, sapling-size trees, and limbwood. Byproducts from primary manufacturing plants include slabs, edging, trimmings, miscuts, sawdust, shavings, veneer cores and clippings, and screenings of pulpmills that are used as pulpwood chips or other products.

Timberland.—Forest land that is producing, or is capable of producing, more than 20 cubic feet per acre per year of industrial wood crops under natural conditions, that is not withdrawn from timber utilization, and that is not associated with urban or rural development. Currently inaccessible and inoperable areas are included. (Timberland was formerly called commercial forest land.)

Tree.—A woody plant usually having one or more perennial stems, a more or less definitely formed crown of foliage, and a height of at least 12 feet at maturity.

Tree biomass.—The total aboveground weight (including the bark but excluding the foliage) of all trees from 1 to 5 inches in d.b.h., and the total aboveground weight (including the bark but excluding the foliage) from a 1-foot stump for trees more than 5 inches in diameter.

Tree grade.—A classification of the lower 16 feet of the bole of standing trees based on external characteristics as indicators of the quality and quantity of lumber that could be produced from the tree. Tree grade was assigned to a sample of hardwood sawtimber trees during the 1993 inventory. Also see Log grade. (See Appendix for specific grading factors used.)

Tree size class.—A classification of trees based on diameter at breast height, including sawtimber trees, poletimber trees, saplings, and seedlings.

Upper stem portion.—That part of the bole of sawtimber trees above the saw-log top to a minimum top diameter of 4.0 inches d.o.b. or to the point where the central stem breaks into limbs.

Urban and other areas.—Areas within the legal boundaries of cities and towns; suburban areas developed for residential, industrial, or recreational purposes; school yards; cemeteries; roads; railroads; airports; beaches; powerlines and other rights-of-way; or other nonforest land not included in any other specified land use class.

Urban forest land.—Land that would otherwise meet the criteria for timberland, but that is in an urban-suburban area surrounded by commercial, industrial, or residential development and not likely to be managed for the production of industrial wood products on a continuing basis. Wood removed would be for land clearing, fuelwood, or esthetic purposes. Such forest land may be associated with industrial, commercial, residential subdivision, industrial parks, golf course perimeters, airport buffer strips, and public urban parks that qualify as forest land.

Water.—*(a) Bureau of the Census*.—Permanent inland water surfaces, such as lakes, reservoirs, and ponds at least 40 acres in area; and streams, sloughs, estuaries, and canals at least one-eighth of a statute mile wide.

(b) Noncensus.—Permanent inland water surfaces, such as lakes, reservoirs, and ponds from 1 to 39.9 acres in area; and streams, sloughs, estuaries, and canals from 120 feet to one-eighth of a statute mile wide.

Wooded pasture.—Improved pasture with more than 16.7 percent stocking in live trees, but less than 25 percent stocking in growing-stock trees. Area is currently improved for grazing or there is other evidence of grazing.

Wooded strip.—An acre or more of natural continuous forest land that would otherwise meet survey standards for timberland except that it is less than 120 feet wide.

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Table 1. -- Area of land by Forest Survey Unit, county, and major land-use class, Michigan, 1993

(In thousand acres)

Forest Survey Unit and county	Total [1] land area	Forest land				Other [2] land
		Total forest	Timberland	Reserved forest land	Other forest land	
Eastern Upper Peninsula						
Alger	587.5	531.6	471.4	53.6	6.6	55.9
Chippewa	999.1	749.0	707.7	27.1	14.2	250.1
Delta	748.9	602.2	595.5	1.5	5.2	146.7
Luce	578.0	472.7	463.4	3.2	6.1	105.3
Mackinac	653.8	555.4	522.2	26.1	7.1	98.4
Menominee	667.9	524.6	523.3	1.3	-	143.3
Schoolcraft	754.0	540.5	525.4	8.1	7.0	213.5
Total	4,989.2	3,976.0	3,808.9	120.9	46.2	1,013.2
Western Upper Peninsula						
Baraga	578.7	508.3	486.7	19.3	2.3	70.4
Dickinson	490.5	398.2	398.2	-	-	92.3
Gogebic	705.2	635.3	608.4	26.9	-	69.9
Houghton	647.5	540.4	528.9	9.9	1.6	107.1
Iron	746.6	662.3	658.0	-	4.3	84.3
Keweenaw	346.4	312.1	198.5	112.3	1.3	34.3
Marquette	1,165.6	1,027.4	1,005.1	14.3	8.0	138.2
Ontonagon	839.4	752.5	705.6	46.9	-	86.9
Total	5,519.9	4,836.5	4,589.4	229.6	17.5	683.4
Northern Lower Peninsula						
Alcona	431.7	333.0	321.9	9.0	2.1	98.7
Alpena	367.5	236.2	233.0	3.2	-	131.3
Antrim	305.2	189.7	189.7	-	-	115.5
Arenac	234.8	121.1	121.1	-	-	113.7
Bay	284.3	44.2	43.3	0.9	-	240.1
Benzie	205.7	146.6	136.9	9.7	-	59.1
Charlevoix	266.8	172.2	170.4	1.8	-	94.6
Cheboygan	458.0	350.3	339.6	9.8	0.9	107.7
Clare	362.8	245.5	245.5	-	-	117.3
Crawford	357.2	308.1	290.0	18.1	-	49.1
Emmet	299.5	208.1	197.6	8.2	2.3	91.4
Gladwin	324.4	186.9	186.9	-	-	137.5
Grand Traverse	297.7	175.8	170.9	2.7	2.2	121.9
Iosco	351.5	244.4	242.6	-	1.8	107.1
Isabella	367.6	101.6	101.6	-	-	266.0
Kalkaska	359.1	271.1	267.4	3.7	-	88.0
Lake	363.3	315.2	315.2	-	-	48.1
Leelanau	223.0	126.9	88.4	38.5	-	96.1
Manistee	348.1	253.3	249.1	4.2	-	94.8
Mason	316.9	172.7	157.0	12.9	2.8	144.2
Mecosta	355.7	163.4	163.4	-	-	192.3
Midland	333.6	175.6	175.6	-	-	158.0
Missaukee	362.7	237.9	229.3	6.9	1.7	124.8
Montmorency	350.5	293.8	293.6	0.2	-	56.7
Newaygo	539.2	331.5	330.4	1.1	-	207.7
Oceana	345.9	186.9	182.0	4.9	-	159.0
Ogemaw	361.2	229.1	228.5	0.6	-	132.1
Osceola	362.3	185.6	185.6	-	-	176.7
Oscoda	361.6	317.2	307.9	9.3	-	44.4
Otsego	329.3	239.6	239.6	-	-	89.7
Presque Isle	422.4	311.4	298.8	1.6	11.0	111.0
Roscommon	333.7	258.0	254.8	1.5	1.7	75.7
Wexford	362.0	281.7	259.3	22.4	-	80.3
Total	11,345.2	7,414.6	7,216.9	171.2	26.5	3,930.6

(Table 1 continued on next page)

(Table 1 continued)

Forest Survey Unit and county	Total[1] land area	Forest land				Other[2] land
		Total forest	Timberland	Reserved forest land	Other forest land	
Southern Lower Peninsula						
Allegan	529.6	179.9	178.4	1.5	-	349.7
Barry	355.9	111.2	111.2	-	-	244.7
Berrien	365.5	68.3	67.0	1.3	-	297.2
Branch	324.9	54.4	54.4	-	-	270.5
Calhoun	453.7	111.0	110.6	0.4	-	342.7
Cass	315.0	76.9	76.9	-	-	238.1
Clinton	365.7	55.4	53.8	1.6	-	310.3
Eaton	369.0	82.1	82.1	-	-	286.9
Genesee	409.4	64.9	64.9	-	-	344.5
Gratiot	364.9	49.2	49.2	-	-	315.7
Hillsdale	383.3	74.1	74.1	-	-	309.2
Huron	535.4	66.2	64.5	1.7	-	469.2
Ingham	357.9	62.0	62.0	-	-	295.9
Ionia	366.9	74.6	74.6	-	-	292.3
Jackson	452.3	82.3	82.3	-	-	370.0
Kalamazoo	359.6	79.0	75.0	4.0	-	280.6
Kent	548.0	155.5	155.5	-	-	392.5
Lapeer	418.8	110.3	109.4	0.9	-	308.5
Lenawee	480.4	55.2	55.2	-	-	425.2
Livingston	363.8	100.0	94.1	5.9	-	263.8
Macomb	307.5	61.4	60.6	0.8	-	246.1
Monroe	352.7	37.9	37.9	-	-	314.8
Montcalm	453.2	133.0	133.0	-	-	320.2
Muskegon	325.9	162.2	159.9	2.3	-	163.7
Oakland	558.5	137.4	111.2	26.2	-	421.1
Ottawa	362.1	79.1	79.1	-	-	283.0
Saginaw	517.7	98.9	98.9	-	-	418.8
St. Clair	463.6	79.7	78.3	1.4	-	383.9
St. Joseph	322.4	65.6	65.6	-	-	256.8
Sanilac	616.9	79.9	79.9	-	-	537.0
Shiawassee	344.9	50.2	50.2	-	-	294.7
Tuscola	520.1	115.5	115.5	-	-	404.6
Van Buren	391.0	122.3	122.3	-	-	268.7
Washtenaw	454.4	82.2	82.2	-	-	372.2
Wayne	393.0	35.9	30.9	5.0	-	357.1
Total	14,503.9	3,053.7	3,000.7	53.0	-	11,450.2
All counties	36,358.2	19,280.8	18,615.9	574.7	90.2	17,077.4

[1] From U. S. Bureau of the Census, 1990.

[2] Includes 183.5 thousand acres of water according to FIA standards of area classification, but defined by the Bureau of the Census as land.

Table 2. -- Area of timberland by Forest Survey Unit, county, and ownership class, Michigan, 1993

(In thousand acres)

Forest Survey Unit and county	All ownerships	National forest	Other federal	State	County and municipal	Indian	Forest industry	Individual	Corporate
Eastern Upper Peninsula									
Alger	471.4	105.3	4.0	81.3	-	-	33.6	90.8	156.4
Chippewa	707.7	210.4	0.9	155.8	1.1	1.3	57.4	227.9	52.9
Delta	595.5	218.9	1.5	61.7	4.9	-	68.4	220.0	20.1
Luce	463.4	-	-	215.4	-	-	84.0	115.6	48.4
Mackinac	522.2	123.6	-	165.1	1.7	-	20.6	166.6	44.6
Menominee	523.3	-	-	72.6	2.3	6.9	118.1	303.8	19.6
Schoolcraft	525.4	105.7	14.1	185.3	2.7	-	40.3	117.2	60.1
Total	3,808.9	763.9	20.5	937.2	12.7	8.2	422.4	1,241.9	402.1
Western Upper Peninsula									
Baraga	486.7	33.7	10.1	57.9	1.3	6.4	252.4	101.0	23.9
Dickinson	398.2	-	1.6	195.9	4.0	-	38.6	123.3	34.8
Gogebic	608.4	267.1	-	2.7	57.7	-	123.7	91.0	66.2
Houghton	528.9	141.5	-	40.3	5.8	-	89.6	150.1	101.6
Iron	658.0	169.0	-	73.8	3.1	-	95.9	162.8	153.4
Keweenaw	198.5	-	1.3	1.2	-	-	160.3	19.7	16.0
Marquette	1,005.1	5.0	1.4	224.5	14.2	-	171.4	295.4	293.2
Ontonagon	705.6	247.1	2.7	20.4	3.9	-	153.8	133.4	144.3
Total	4,589.4	863.4	17.1	616.7	90.0	6.4	1,085.7	1,076.7	833.4
Northern Lower Peninsula									
Alcona	321.9	101.8	-	2.1	6.6	-	-	164.3	47.1
Alpena	233.0	-	-	36.8	2.4	-	-	156.0	37.8
Antrim	189.7	-	-	51.1	6.4	-	-	121.7	10.5
Arenac	121.1	-	-	34.3	1.8	-	-	81.5	3.5
Bay	43.3	-	-	--	-	-	-	43.3	-
Benzie	136.9	-	-	66.5	-	-	-	62.4	8.0
Charlevoix	170.4	-	-	62.3	-	-	-	92.5	15.6
Cheboygan	339.6	-	-	168.2	-	-	-	154.1	17.3
Clare	245.5	-	4.1	53.3	-	-	-	158.1	30.0
Crawford	290.0	35.9	2.1	151.9	-	-	-	95.8	4.3
Emmet	197.6	-	-	75.1	4.9	-	-	108.1	9.5
Gladwin	186.9	-	-	75.4	4.4	-	-	104.0	3.1
Grand Traverse	170.9	-	-	70.6	4.4	-	-	89.3	6.6
Iosco	242.6	107.8	-	15.2	-	-	-	98.7	20.9
Isabella	101.6	-	-	3.2	-	-	-	93.9	4.5
Kalkaska	267.4	-	-	144.1	-	-	-	105.6	17.7
Lake	315.2	111.9	1.7	63.5	-	-	-	125.0	13.1
Leelanau	88.4	-	-	5.9	-	-	-	77.2	5.3
Manistee	249.1	82.1	-	15.0	10.7	-	-	110.9	30.4
Mason	157.0	47.8	-	7.0	3.4	-	5.6	85.4	7.8
Mecosta	163.4	-	-	20.7	7.1	-	-	129.8	5.8
Midland	175.6	-	-	47.0	1.6	-	0.6	119.3	7.1
Missaukee	229.3	-	-	106.6	-	-	-	99.6	23.1
Montmorency	293.6	-	-	148.1	-	-	-	123.9	21.6
Newaygo	330.4	107.0	-	4.0	2.3	-	-	208.5	8.6
Oceana	182.0	52.7	-	1.8	2.3	-	-	111.2	14.0
Ogemaw	228.5	20.1	-	65.9	5.1	-	-	118.9	18.5
Osceola	185.6	-	-	20.9	1.7	-	-	149.4	13.6
Oscoda	307.9	141.2	-	42.4	-	-	-	77.1	47.2
Otsego	239.6	-	1.9	82.2	-	-	-	130.1	25.4
Presque Isle	298.8	-	2.2	66.0	1.2	-	-	183.9	45.5
Roscommon	254.8	-	-	168.3	1.7	-	-	52.8	32.0
Wexford	259.3	92.6	-	60.9	-	-	-	94.5	11.3
Total	7,216.9	900.9	12.0	1,936.3	68.0	-	6.2	3,726.8	566.7

(Table 2 continued on next page)

(Table 2 continued)

Forest Survey Unit and county	All ownerships	National forest	Other federal	State	County and municipal	Indian	Forest industry	Individual	Corporate
Southern Lower Peninsula									
Allegan	178.4	-	-	55.8	-	-	-	114.6	8.0
Barry	111.2	-	-	19.8	-	-	-	91.4	-
Berrien	67.0	-	-	2.7	9.6	-	-	49.3	5.4
Branch	54.4	-	-	-	3.0	-	-	51.4	-
Calhoun	110.6	-	-	-	-	-	-	103.0	7.6
Cass	76.9	-	-	-	-	-	-	68.8	8.1
Clinton	53.8	-	-	-	2.6	-	-	43.8	7.4
Eaton	82.1	-	-	-	-	-	-	53.2	28.9
Genesee	64.9	-	-	-	3.7	-	-	61.2	-
Gratiot	49.2	-	-	7.3	-	-	-	41.9	-
Hillsdale	74.1	-	-	-	-	-	-	74.1	-
Huron	64.5	-	-	9.7	2.8	-	-	52.0	-
Ingham	62.0	-	-	3.6	-	-	-	54.7	3.7
Ionia	74.6	-	-	4.0	3.8	-	-	66.8	-
Jackson	82.3	-	-	13.1	2.6	-	-	58.5	8.1
Kalamazoo	75.0	-	-	6.2	5.8	-	-	63.0	-
Kent	155.5	-	-	1.5	-	-	-	145.7	8.3
Lapeer	109.4	-	-	15.8	2.9	-	-	80.3	10.4
Lenawee	55.2	-	-	-	-	-	-	53.0	2.2
Livingston	94.1	-	-	5.6	-	-	-	70.9	17.6
Macomb	60.6	-	-	2.4	9.0	-	-	19.7	29.5
Monroe	37.9	-	-	1.5	-	-	-	30.1	6.3
Montcalm	133.0	1.8	-	18.5	5.9	-	-	96.5	10.3
Muskegon	159.9	12.4	-	8.8	21.8	-	-	101.4	15.5
Oakland	111.2	-	-	-	-	-	-	79.2	32.0
Ottawa	79.1	-	-	-	5.1	-	-	65.0	9.0
Saginaw	98.9	-	-	9.6	-	-	-	89.3	-
St. Clair	78.3	-	-	11.0	-	-	-	51.1	16.2
St. Joseph	65.6	-	-	4.6	-	-	-	61.0	-
Sanilac	79.9	-	-	2.9	-	-	-	68.3	8.7
Shiawassee	50.2	-	-	-	-	-	-	47.2	3.0
Tuscola	115.5	-	-	21.2	-	-	-	94.3	-
Van Buren	122.3	-	-	-	1.1	-	-	117.9	3.3
Washtenaw	82.2	-	-	12.4	3.5	-	-	59.5	6.8
Wayne	30.9	-	-	-	2.4	-	-	25.0	3.5
Total	3,000.7	14.2	-	238.0	85.6	-	-	2,403.1	259.8
All counties	18,615.9	2,542.4	49.6	3,728.2	256.3	14.6	1,514.3	8,448.5	2,062.0

Table 3. -- Area of timberland by Forest Survey Unit, county, and forest type group/local type, Michigan, 1993

(In thousand acres)

Forest Survey Unit and county	All types	Forest type group/local type																	
		White-red-jack pine				Spruce-fir						Oak-hickory	Elm-ash-cottonwood	Maple-beech-birch	Aspen-birch				Non-stocked
		Total	Jack pine	Red pine	White pine	Total	Balsam fir	White spruce	Black spruce	Northern white-cedar	Tamarack	Oak-hickory	Elm-ash-soft maple	Maple-beech-birch	Total	Aspen	Paper birch	Balsam poplar	
Eastern Upper Peninsula																			
Alger	471.4	50.7	8.2	28.4	14.1	65.0	13.4	5.3	11.6	34.7	-	-	20.2	314.4	19.0	16.4	1.3	1.3	2.1
Chippewa	707.7	104.4	70.1	23.3	11.0	216.4	47.9	17.5	46.9	89.7	14.4	16.4	38.9	168.2	163.4	129.0	14.4	20.0	-
Delta	595.5	45.1	14.8	28.3	2.0	233.0	51.9	13.8	35.5	124.8	7.0	7.5	40.6	138.3	131.0	87.9	7.8	35.3	-
Luce	463.4	76.7	45.5	19.0	12.2	126.6	10.5	-	43.9	65.1	7.1	3.0	18.6	201.9	33.9	30.1	2.1	1.7	2.7
Mackinac	522.2	49.0	9.8	29.8	9.4	202.2	47.8	15.4	27.6	107.9	3.5	-	22.5	129.0	117.1	73.9	19.7	23.5	2.4
Menominee	523.3	13.1	1.2	3.4	8.5	201.6	34.8	6.7	19.6	126.0	14.5	6.5	56.9	138.8	105.3	70.4	21.1	13.8	1.1
Schoolcraft	525.4	82.3	45.4	26.0	10.9	169.5	26.3	3.4	47.1	84.7	8.0	4.2	23.0	173.7	72.7	52.6	13.4	6.7	- -
Total	3,808.9	421.3	195.0	158.2	68.1	1,214.3	232.6	62.1	232.2	632.9	54.5	37.6	220.7	1,264.3	642.4	460.3	79.8	102.3	8.3
Western Upper Peninsula																			
Baraga	486.7	12.1	7.2	3.6	1.3	96.4	31.8	1.0	24.9	32.8	5.9	0.6	17.3	320.4	39.9	33.8	5.0	1.1	-
Dickinson	398.2	16.9	3.0	6.3	7.6	127.2	40.5	4.0	25.6	53.9	3.2	4.2	15.7	114.8	119.4	99.4	7.6	12.4	-
Gogebic	608.4	17.9	-	17.9	-	95.1	35.5	9.7	10.8	29.3	9.8	2.7	49.4	376.8	64.8	60.9	3.9	-	1.7
Houghton	528.9	30.6	13.3	15.7	1.6	53.1	20.1	5.4	4.6	16.6	6.4	2.4	22.3	361.7	58.8	51.0	7.8	-	-
Iron	658.0	30.9	1.2	18.7	11.0	158.1	58.8	8.7	49.4	25.0	16.2	2.9	4.8	307.3	154.0	123.1	23.4	7.5	-
Keweenaw	198.5	3.5	-	-	3.5	63.1	11.9	4.9	5.2	41.1	-	4.2	5.6	95.1	27.0	13.5	13.5	-	-
Marquette	1,005.1	94.5	62.6	19.9	12.0	231.6	52.1	9.4	79.1	84.1	6.9	10.7	46.8	454.6	161.9	127.1	31.5	3.3	5.0
Ontonagon	705.6	24.9	-	15.7	9.2	42.4	17.2	8.1	8.6	8.5	-	1.3	27.1	435.1	174.8	167.8	5.2	1.8	-
Total	4,589.4	231.3	87.3	97.8	46.2	867.0	267.9	51.2	208.2	291.3	48.4	29.0	189.0	2,465.8	800.6	676.6	97.9	26.1	6.7
Northern Lower Peninsula																			
Alcona	321.9	33.6	8.0	20.8	4.8	51.2	6.2	5.4	2.6	34.9	2.1	88.7	8.4	39.2	100.4	88.4	2.1	9.9	0.4
Alpena	233.0	18.6	7.4	7.1	4.1	53.6	13.3	2.4	-	36.8	1.1	8.1	27.2	36.8	87.0	66.7	14.9	5.4	1.7
Antrim	189.7	14.0	6.8	7.2	-	15.2	-	-	-	15.2	-	-	6.1	126.4	28.0	28.0	- -	-	-
Arenac	121.1	5.0	5.0	-	-	2.8	1.8	1.0	-	-	-	26.6	25.2	23.4	38.1	35.2	2.9	-	-
Bay	43.3	-	-	-	-	-	-	-	-	-	-	-	19.6	8.4	15.3	15.3	-	-	-
Benzie	136.9	17.0	3.3	13.7	-	5.6	-	2.3	-	-	3.3	-	12.2	93.0	9.1	9.1	-	-	-
Charlevoix	170.4	16.6	-	7.8	8.8	30.3	2.1	-	-	19.3	8.7	-	6.2	107.3	10.0	5.3	4.7	-	-
Cheboygan	339.6	36.6	17.5	16.8	2.3	34.7	2.7	1.2	2.3	28.5	-	14.9	16.2	122.1	115.1	107.5	3.6	4.0	-
Clare	245.5	39.9	24.5	15.4	-	5.3	-	-	-	3.8	1.5	46.3	33.4	57.1	63.5	63.5	-	-	-
Crawford	290.0	108.2	89.3	16.8	2.1	16.7	-	-	10.3	6.4	-	73.4	2.2	42.7	46.8	40.4	4.3	2.1	-
Emmet	197.6	14.6	7.0	7.6	-	15.2	1.3	1.7	-	12.2	-	1.8	10.2	118.8	37.0	31.1	5.9	-	-
Gladwin	186.9	8.0	1.9	6.1	-	-	-	-	-	-	-	26.2	29.6	33.7	89.4	80.0	-	9.4	-
Grand Traverse	170.9	51.9	13.3	36.4	2.2	9.2	-	-	-	7.0	2.2	30.8	4.4	42.3	32.3	27.9	4.4	-	-
Iosco	242.6	89.2	40.5	42.3	6.4	27.0	-	-	-	21.8	5.2	23.8	25.4	30.7	46.5	35.3	4.6	6.6	-
Isabella	101.6	7.0	4.0	2.5	0.5	2.4	-	-	-	2.4	-	15.3	14.0	25.1	37.8	35.7	2.1	-	-
Kalkaska	267.4	65.9	26.8	37.1	2.0	17.7	2.0	-	-	15.7	-	12.1	-	121.4	47.8	44.7	3.1	-	2.5
Lake	315.2	74.7	21.3	44.7	8.7	8.3	-	-	-	8.3	-	150.9	9.2	42.4	29.7	29.7	-	-	-
Leelanau	88.4	17.0	-	10.9	6.1	4.9	-	-	-	4.9	-	-	3.4	55.1	8.0	5.7	2.3	-	-
Manistee	249.1	47.4	10.6	32.9	3.9	4.8	-	-	-	4.8	-	53.5	23.5	88.6	31.3	29.8	1.5	-	-
Mason	157.0	34.1	8.8	24.7	0.6	-	-	-	-	-	-	54.0	22.8	23.6	22.5	22.5	-	-	-
Mecosta	163.4	11.0	4.3	5.5	1.2	5.1	-	1.3	-	3.8	-	13.5	23.9	71.5	38.4	36.8	1.6	-	-
Midland	175.6	0.6	-	-	0.6	-	-	-	-	-	-	27.9	38.7	49.3	59.1	53.3	5.8	-	-
Missaukee	229.3	29.8	12.8	17.0	-	25.6	-	3.0	-	18.6	4.0	27.8	28.6	57.1	60.4	58.9	1.5	-	-
Montmorency	293.6	43.5	23.0	18.6	1.9	28.6	7.5	1.6	-	16.7	2.8	47.7	8.7	88.9	72.3	68.3	2.0	-	3.9
Newaygo	330.4	53.4	13.6	29.4	10.4	1.3	-	-	-	-	1.3	127.6	43.2	85.8	19.1	19.1	-	-	-
Oceana	182.0	25.2	6.3	18.9	-	6.3	-	-	-	6.3	-	56.6	22.9	50.9	19.3	19.3	-	-	0.8
Ogemaw	228.5	50.5	31.0	16.6	2.9	17.1	1.7	-	-	15.4	-	27.7	12.9	52.0	68.3	58.3	10.0	-	-
Osceola	185.6	17.8	6.1	11.7	-	12.2	-	-	-	12.2	-	8.0	12.3	82.9	50.2	49.0	1.2	-	2.2
Oscoda	307.9	104.4	62.7	27.8	13.9	13.3	2.7	-	1.6	6.6	2.4	67.6	3.2	47.7	69.6	66.5	3.1	-	2.1
Otsego	239.6	39.5	13.8	19.8	5.9	20.1	4.0	1.9	1.8	12.4	-	13.5	2.0	130.6	31.8	25.9	3.9	2.0	2.1
Presque Isle	298.8	33.6	15.7	15.9	2.0	79.0	8.1	2.0	2.3	64.2	2.4	25.5	21.3	48.9	89.3	61.2	15.1	13.0	1.2
Roscommon	254.8	32.5	18.2	12.2	2.1	40.2	9.2	-	-	31.0	-	83.6	15.2	30.1	53.2	51.4	1.8	-	-
Wexford	259.3	67.2	17.1	47.6	2.5	16.0	-	1.2	3.6	10.0	1.2	15.4	13.8	96.5	50.4	46.0	4.4	-	-
Total	7,216.9	1,208.3	520.6	591.8	95.9	569.7	62.6	25.0	24.7	419.2	38.2	1,168.8	545.9	2,130.3	1,577.0	1,415.8	106.8	54.4	16.9

(Table 3 continued on next page)

(Table 3 continued)

Forset Survey Unit and county	All types	Forest type group/local type																		
		White-red-jack pine				Spruce-fir						Oak-hickory	Elm-ash-cottonwood	Maple-beech-birch	Aspen-birch				Non-stocked
		Total	Jack pine	Red pine	White pine	Total	Balsam fir	White spruce	Black spruce	Northern white-cedar	Tamarack	Oak-hickory	Elm-ash-soft maple	Maple-beech-birch	Total	Aspen	Paper birch	Balsam poplar	Non-stocked
Southern Lower Peninsula																			
Allegan	178.4	7.7	4.6	0.6	2.5	-	-	-	-	-	-	71.3	27.8	67.6	4.0	4.0	--	--	--
Barry	111.2	2.2	2.2	-	-	1.1	-	1.1	-	-	-	44.7	13.0	50.2	--	--	--	--	--
Berrien	67.0	4.0	4.0	-	-	-	-	-	-	-	-	16.8	15.0	31.2	--	--	--	--	--
Branch	54.4	-	-	-	-	-	-	-	-	-	-	8.8	24.3	21.3	--	--	--	--	--
Calhoun	110.6	-	-	-	-	-	-	-	-	-	-	18.9	17.3	72.3	2.1	2.1	--	--	--
Cass	76.9	0.2	0.2	-	-	-	-	-	-	-	-	17.6	14.8	44.3	--	--	--	--	--
Clinton	53.8	-	-	-	-	-	-	-	-	-	-	13.1	21.3	19.4	--	--	--	--	--
Eaton	82.1	-	-	-	-	-	-	-	-	-	-	3.7	46.2	32.2	--	--	--	--	--
Genesee	64.9	1.6	1.6	-	-	-	-	-	-	-	-	15.2	18.9	27.5	1.7	--	1.7	--	--
Gratiot	49.2	2.1	-	-	2.1	-	-	-	-	-	-	19.2	1.5	26.4	--	--	--	--	--
Hillsdale	74.1	8.9	4.2	-	4.7	0.7	-	-	-	-	0.7	11.8	16.7	36.0	--	--	--	--	--
Huron	64.5	-	-	-	-	-	-	-	-	-	-	2.9	25.1	25.1	11.4	8.5	--	2.9	--
Ingham	62.0	-	-	-	-	-	-	-	-	-	-	3.6	11.0	47.4	--	--	--	--	--
Ionia	74.6	-	-	-	-	3.8	-	3.8	-	-	-	11.6	3.9	34.6	20.7	20.7	--	--	--
Jackson	82.3	2.7	2.7	-	-	-	-	-	-	-	-	36.4	10.9	32.3	--	-	--	--	--
Kalamazoo	75.0	12.8	7.1	5.7	-	-	-	-	-	-	-	16.0	13.8	29.2	3.2	3.2	--	--	--
Kent	155.5	15.6	2.4	13.2	-	-	-	-	-	-	-	45.2	29.4	56.3	9.0	9.0	--	--	--
Lapeer	109.4	6.7	-	6.7	-	6.7	-	3.7	-	-	3.0	21.3	33.3	38.4	3.0	3.0	--	--	--
Lenawee	55.2	-	-	-	-	-	-	-	-	-	-	11.3	13.0	28.7	2.2	2.2	--	--	--
Livingston	94.1	2.6	-	2.6	-	-	-	-	-	-	-	39.9	22.7	28.9	--	--	--	--	--
Macomb	60.6	-	-	-	-	-	-	-	-	-	-	12.9	25.6	22.1	--	--	--	--	--
Monroe	37.9	-	-	-	-	-	-	-	-	-	-	10.5	3.4	24.0	--	--	--	--	--
Montcalm	133.0	7.0	-	4.3	2.7	4.1	-	-	-	-	4.1	29.9	39.1	42.9	10.0	10.0	--	--	--
Muskegon	159.9	19.6	7.1	11.6	0.9	-	-	-	-	-	-	71.2	15.5	40.5	6.5	6.5	--	--	6.6
Oakland	111.2	-	-	-	-	-	-	-	-	-	-	24.6	23.6	60.4	2.6	2.6	--	--	--
Ottawa	79.1	9.6	4.9	4.7	-	-	-	-	-	-	-	15.2	18.1	32.8	3.4	3.4	--	--	--
Saginaw	98.9	6.4	1.1	-	5.3	-	-	-	-	-	-	28.1	22.2	38.5	3.7	3.7	--	--	--
St. Clair	78.3	-	-	-	-	-	-	-	-	-	-	14.4	11.0	48.3	4.6	4.6	--	--	--
St. Joseph	65.6	2.8	-	-	2.8	-	-	-	-	-	-	25.0	14.5	21.0	2.3	2.3	--	--	--
Sanilac	79.9	2.6	-	-	2.6	-	-	-	-	-	-	--	13.2	45.1	19.0	10.8	5.3	2.9	--
Shiawassee	50.2	-	-	-	-	-	-	-	-	-	-	16.6	17.2	16.4	--	--	--	--	--
Tuscola	115.5	-	-	-	-	6.0	-	-	-	-	-	3.1	39.1	43.3	24.0	24.0	--	--	--
Van Buren	122.3	1.1	1.1	-	-	-	-	-	-	-	-	19.0	22.1	77.7	2.4	2.4	--	--	--
Washtenaw	82.2	-	-	-	-	-	-	-	-	-	-	37.2	12.5	31.4	1.1	--	--	1.1	--
Wayne	30.9	-	-	-	-	-	-	-	-	-	-	9.4	14.3	7.2	--	--	--	--	--
Total	3,000.7	116.2	43.2	49.4	23.6	22.4	-	8.6	-	6.0	7.8	746.4	671.3	1,300.9	136.9	123.0	7.0	6.9	6.6
All counties	18,615.9	1,977.1	846.1	897.2	233.8	2,673.4	563.1	146.9	465.1	1,349.4	148.9	1,981.8	1,626.9	7,161.3	3,156.9	2,675.7	291.5	189.7	38.5

Table 4. -- Area of timberland by Forest Survey Unit, county, and stand-size class, Michigan, 1993

(In thousand acres)

Forest Survey Unit and county	All stands	Stand-size class			
		Sawtimber	Poletimber	Sapling-seedling	Nonstocked
Eastern Upper Peninsula					
Alger	471.4	260.6	116.4	92.3	2.1
Chippewa	707.7	288.5	184.3	234.9	-
Delta	595.5	197.6	204.0	193.9	-
Luce	463.4	265.8	101.1	93.8	2.7
Mackinac	522.2	189.6	186.6	143.6	2.4
Menominee	523.3	120.3	201.5	200.4	1.1
Schoolcraft	525.4	231.0	136.1	158.3	-
Total	3,808.9	1,553.4	1,130.0	1,117.2	8.3
Western Upper Peninsula					
Baraga	486.7	310.5	80.6	95.6	-
Dickinson	398.2	151.2	155.4	91.6	-
Gogebic	608.4	299.1	223.2	84.4	1.7
Houghton	528.9	292.7	154.7	81.5	-
Iron	658.0	291.0	180.8	186.2	-
Keweenaw	198.5	124.6	43.2	30.7	-
Marquette	1,005.1	458.6	264.6	276.9	5.0
Ontonagon	705.6	346.9	191.0	167.7	-
Total	4,589.4	2,274.6	1,293.5	1,014.6	6.7
Northern Lower Peninsula					
Alcona	321.9	173.5	113.3	34.7	0.4
Alpena	233.0	77.5	91.7	62.1	1.7
Antrim	189.7	74.9	79.8	35.0	-
Arenac	121.1	39.9	29.9	51.3	-
Bay	43.3	12.6	11.1	19.6	-
Benzie	136.9	67.4	38.5	31.0	-
Charlevoix	170.4	106.7	57.5	6.2	-
Cheboygan	339.6	128.1	109.7	101.8	-
Clare	245.5	116.7	64.1	64.7	-
Crawford	290.0	102.6	113.7	73.7	-
Emmet	197.6	83.7	83.9	30.0	-
Gladwin	186.9	66.7	60.7	59.5	-
Grand Traverse	170.9	81.8	68.7	20.4	-
Iosco	242.6	110.4	85.6	46.6	-
Isabella	101.6	48.5	26.4	26.7	-
Kalkaska	267.4	99.7	106.2	59.0	2.5
Lake	315.2	151.1	95.5	68.6	-
Leelanau	88.4	56.3	22.3	9.8	-
Manistee	249.1	100.6	89.8	58.7	-
Mason	157.0	88.9	42.9	25.2	-
Mecosta	163.4	59.9	51.7	51.8	-
Midland	175.6	82.2	39.7	53.7	-
Missaukee	229.3	86.4	75.5	67.4	-
Montmorency	293.6	107.2	85.9	96.6	3.9
Newaygo	330.4	202.3	93.2	34.9	-
Oceana	182.0	91.3	40.9	49.0	0.8
Ogemaw	228.5	73.1	95.7	59.7	-
Osceola	185.6	65.0	57.6	60.8	2.2
Oscoda	307.9	105.3	79.7	120.8	2.1
Otsego	239.6	86.8	109.1	41.6	2.1
Presque Isle	298.8	98.9	122.6	76.1	1.2
Roscommon	254.8	120.1	72.3	62.4	-
Wexford	259.3	86.7	139.5	33.1	-
Total	7,216.9	3,052.8	2,454.7	1,692.5	16.9

(Table 4 continued on next page)

(Table 4 continued)

Forest Survey Unit and county	All stands	Stand-size class			
		Sawtimber	Poletimber	Sapling-seedling	Nonstocked
Southern Lower Peninsula					
Allegan	178.4	111.7	35.4	31.3	-
Barry	111.2	67.3	15.4	28.5	-
Berrien	67.0	61.2	4.0	1.8	-
Branch	54.4	30.4	11.5	12.5	-
Calhoun	110.6	67.8	30.8	12.0	-
Cass	76.9	50.7	22.2	4.0	-
Clinton	53.8	22.8	10.4	20.6	-
Eaton	82.1	48.5	33.6	-	-
Genesee	64.9	27.2	8.1	29.6	-
Gratiot	49.2	29.3	5.5	14.4	-
Hillsdale	74.1	39.3	21.8	13.0	-
Huron	64.5	37.4	15.3	11.8	-
Ingham	62.0	43.1	7.9	11.0	-
Ionia	74.6	38.4	36.2	-	-
Jackson	82.3	66.0	8.0	8.3	-
Kalamazoo	75.0	42.7	18.3	14.0	-
Kent	155.5	83.7	34.7	37.1	-
Lapeer	109.4	51.6	21.9	35.9	-
Lenawee	55.2	33.2	13.3	8.7	-
Livingston	94.1	84.3	4.6	5.2	-
Macomb	60.6	19.1	19.1	22.4	-
Monroe	37.9	27.2	9.7	1.0	-
Montcalm	133.0	83.2	32.3	17.5	-
Muskegon	159.9	86.0	39.6	27.7	6.6
Oakland	111.2	52.8	27.3	31.1	-
Ottawa	79.1	50.7	19.0	9.4	-
Saginaw	98.9	31.8	38.1	29.0	-
St. Clair	78.3	46.4	15.2	16.7	-
St. Joseph	65.6	48.2	9.2	8.2	-
Sanilac	79.9	19.1	19.9	40.9	-
Shiawassee	50.2	36.2	5.4	8.6	-
Tuscola	115.5	34.0	36.4	45.1	-
Van Buren	122.3	73.9	18.4	30.0	-
Washtenaw	82.2	60.0	6.7	15.5	-
Wayne	30.9	18.9	7.9	4.1	-
Total	3,000.7	1,724.1	663.1	606.9	6.6
All counties	18,615.9	8,604.9	5,541.3	4,431.2	38.5

Table 5. -- Area of timberland by Forest Survey Unit, county, and potential productivity class, Michigan, 1993

(In thousand acres)

Forest Survey Unit and county	All classes	Potential productivity class (cubic feet of growth per acre per year)				
		165+	120-164	85-119	50-84	20- 49
Eastern Upper Peninsula						
Alger	471.4	-	13.5	72.5	208.0	177.4
Chippewa	707.7	-	12.1	95.9	225.9	373.8
Delta	595.5	-	19.4	96.4	237.9	241.8
Luce	463.4	-	3.9	38.8	161.0	259.7
Mackinac	522.2	1.8	13.1	81.6	203.7	222.0
Menominee	523.3	2.4	31.0	86.9	196.5	206.5
Schoolcraft	525.4	-	15.9	44.2	199.6	265.7
Total	3,808.9	4.2	108.9	516.3	1,432.6	1,746.9
Western Upper Peninsula						
Baraga	486.7	1.2	8.8	65.9	215.6	195.2
Dickinson	398.2	2.2	17.8	95.0	180.2	103.0
Gogebic	608.4	1.2	43.8	103.6	262.4	197.4
Houghton	528.9	-	23.3	105.4	295.3	104.9
Iron	658.0	1.1	38.3	130.8	330.7	157.1
Keweenaw	198.5	-	1.2	12.9	53.4	131.0
Marquette	1,005.1	1.3	29.9	122.7	402.9	448.3
Ontonagon	705.6	1.8	23.7	159.1	367.9	153.1
Total	4,589.4	8.8	186.8	795.4	2,108.4	1,490.0
Northern Lower Peninsula						
Alcona	321.9	4.3	26.3	92.6	137.2	61.5
Alpena	233.0	2.3	10.0	63.9	70.4	86.4
Antrim	189.7	2.1	4.2	56.6	80.1	46.7
Arenac	121.1	1.8	5.0	44.1	48.7	21.5
Bay	43.3	2.7	-	20.8	14.2	5.6
Benzie	136.9	3.3	15.1	23.8	51.8	42.9
Charlevoix	170.4	-	3.9	49.8	77.4	39.3
Cheboygan	339.6	-	9.1	78.5	144.4	107.6
Clare	245.5	2.1	16.4	81.2	86.9	58.9
Crawford	290.0	-	4.3	29.7	106.9	149.1
Emmet	197.6	2.3	5.0	49.4	97.8	43.1
Gladwin	186.9	1.8	17.2	58.7	91.5	17.7
Grand Traverse	170.9	-	2.7	30.1	69.3	68.8
Iosco	242.6	-	4.7	57.0	77.9	103.0
Isabella	101.6	-	17.0	44.5	29.9	10.2
Kalkaska	267.4	-	7.9	70.0	99.6	89.9
Lake	315.2	-	25.2	75.4	114.7	99.9
Leelanau	88.4	1.1	9.6	12.4	36.5	28.8
Manistee	249.1	-	6.9	59.8	119.5	62.9
Mason	157.0	-	14.3	35.9	72.2	34.6
Mecosta	163.4	1.9	11.9	56.4	72.9	20.3
Midland	175.6	-	4.1	49.5	93.4	28.6
Missaukee	229.3	-	22.5	68.3	77.3	61.2
Montmorency	293.6	-	5.2	55.6	154.2	78.6
Newaygo	330.4	0.9	18.2	82.0	162.8	66.5
Oceana	182.0	-	12.7	40.5	88.7	40.1
Ogemaw	228.5	1.8	8.4	59.4	76.0	82.9
Osceola	185.6	-	19.3	68.5	75.2	22.6
Oscoda	307.9	-	11.1	50.9	130.7	115.2
Otsego	239.6	4.4	4.1	60.0	125.1	46.0
Presque Isle	298.8	-	2.2	29.2	107.7	159.7
Roscommon	254.8	1.7	3.5	53.8	107.9	87.9
Wexford	259.3	0.5	11.8	82.6	99.3	65.1
Total	7,216.9	35.0	339.8	1,790.9	2,998.1	2,053.1

(Table 5 continued on next page)

(Table 5 continued)

Forest Survey Unit and county	Potential productivity class (cubic feet of growth per acre per year)					
	All classes	165+	120-164	85-119	50-84	20-49
Southern Lower Peninsula						
Allegan	178.4	7.9	5.9	59.2	86.1	19.3
Barry	111.2	7.8	8.3	50.7	34.1	10.3
Berrien	67.0	6.9	6.7	38.4	15.0	-
Branch	54.4	-	6.1	29.3	19.0	-
Calhoun	110.6	3.8	7.5	60.7	38.6	-
Cass	76.9	4.3	9.1	37.7	20.8	5.0
Clinton	53.8	-	-	25.7	17.1	11.0
Eaton	82.1	3.6	11.0	42.7	24.8	-
Genesee	64.9	-	3.7	37.7	18.5	5.0
Gratiot	49.2	-	-	29.4	15.9	3.9
Hillsdale	74.1	-	12.9	31.4	24.4	5.4
Huron	64.5	-	8.6	17.3	27.0	11.6
Ingham	62.0	3.6	7.2	40.2	9.3	1.7
Ionia	74.6	3.8	15.5	19.1	36.2	-
Jackson	82.3	5.4	8.0	35.2	23.9	9.8
Kalamazoo	75.0	5.9	9.6	25.9	23.8	9.8
Kent	155.5	5.1	14.0	53.1	61.8	21.5
Lapeer	109.4	-	9.7	47.7	37.7	14.3
Lenawee	55.2	4.4	2.2	24.6	24.0	-
Livingston	94.1	-	-	54.8	36.3	3.0
Macomb	60.6	-	3.9	22.9	30.0	3.8
Monroe	37.9	-	-	32.5	3.9	1.5
Montcalm	133.0	-	9.4	48.1	49.7	25.8
Muskegon	159.9	-	3.4	42.1	70.7	43.7
Oakland	111.2	-	5.6	39.9	43.4	22.3
Ottawa	79.1	-	8.0	19.5	42.4	9.2
Saginaw	98.9	-	-	23.8	71.8	3.3
St. Clair	78.3	-	4.8	47.8	25.7	-
St. Joseph	65.6	9.2	4.7	27.9	17.4	6.4
Sanilac	79.9	-	-	40.4	39.5	-
Shiawassee	50.2	-	2.8	33.7	13.7	-
Tuscola	115.5	2.6	-	43.1	63.7	6.1
Van Buren	122.3	-	11.2	44.8	61.7	4.6
Washtenaw	82.2	-	-	38.2	39.6	4.4
Wayne	30.9	-	2.3	19.6	3.5	5.5
Total	3,000.7	74.3	202.1	1,285.1	1,171.0	268.2
All counties	18,615.9	122.3	837.6	4,387.7	7,710.1	5,558.2

Table 6. -- Area of timberland by Forest Survey Unit, county, and stocking class of growing-stock trees[1], Michigan, 1993

(In thousand acres)

Forest Survey Unit and county	All classes	Stocking class of growing-stock trees				
		Nonstocked[2]	Poorly stocked	Moderately stocked	Fully stocked	Over-stocked
Eastern Upper Peninsula						
Alger	471.4	3.3	4.1	61.9	220.4	181.7
Chippewa	707.7	-	27.0	120.4	270.1	290.2
Delta	595.5	-	27.3	102.7	216.8	248.7
Luce	463.4	2.7	23.1	123.2	226.6	87.8
Mackinac	522.2	3.5	16.5	69.6	203.3	229.3
Menominee	523.3	3.8	14.0	91.3	234.2	180.0
Schoolcraft	525.4	1.2	23.7	93.8	206.7	200.0
Total	3,808.9	14.5	135.7	662.9	1,578.1	1,417.7
Western Upper Peninsula						
Baraga	486.7	-	12.6	50.3	215.4	208.4
Dickinson	398.2	-	11.7	78.9	192.5	115.1
Gogebic	608.4	1.7	17.1	163.1	272.5	154.0
Houghton	528.9	12.1	29.8	112.1	231.1	143.8
Iron	658.0	1.8	25.9	104.2	311.5	214.6
Keweenaw	198.5	-	5.4	29.8	94.0	69.3
Marquette	1,005.1	6.4	30.5	104.0	408.9	455.3
Ontonagon	705.6	-	18.4	98.0	250.6	338.6
Total	4,589.4	22.0	151.4	740.4	1,976.5	1,699.1
Northern Lower Peninsula						
Alcona	321.9	0.4	13.1	72.2	164.3	71.9
Alpena	233.0	4.0	7.3	46.1	121.4	54.2
Antrim	189.7	-	13.9	33.8	91.1	50.9
Arenac	121.1	-	6.7	39.0	51.0	24.4
Bay	43.3	-	-	15.2	18.2	9.9
Benzie	136.9	-	22.2	24.4	46.9	43.4
Charlevoix	170.4	2.1	8.3	10.2	80.9	68.9
Cheboygan	339.6	6.0	19.5	92.0	158.8	63.3
Clare	245.5	-	20.4	61.0	128.0	36.1
Crawford	290.0	4.0	15.0	102.9	122.1	46.0
Emmet	197.6	2.0	3.4	33.6	98.0	60.6
Gladwin	186.9	-	21.0	60.0	92.1	13.8
Grand Traverse	170.9	1.4	12.4	40.7	76.8	39.6
Iosco	242.6	2.5	24.8	54.9	105.6	54.8
Isabella	101.6	-	9.6	29.3	44.4	18.3
Kalkaska	267.4	3.6	32.6	57.6	116.9	56.7
Lake	315.2	-	7.6	58.7	170.7	78.2
Leelanau	88.4	-	6.0	9.9	41.9	30.6
Manistee	249.1	3.4	23.4	47.1	109.1	66.1
Mason	157.0	-	13.4	30.4	68.5	44.7
Mecosta	163.4	0.5	14.5	41.6	83.6	23.2
Midland	175.6	-	7.3	32.3	113.4	22.6
Missaukee	229.3	-	6.2	57.8	109.6	55.7
Montmorency	293.6	3.9	24.2	75.1	128.2	62.2
Newaygo	330.4	-	17.2	62.4	158.3	92.5
Oceana	182.0	2.3	23.5	30.1	88.1	38.0
Ogemaw	228.5	-	27.5	48.4	102.0	50.6
Osceola	185.6	7.1	29.1	29.9	80.6	38.9
Oscoda	307.9	2.1	25.9	70.8	164.6	44.5
Otsego	239.6	2.1	12.0	60.2	108.3	57.0
Presque Isle	298.8	1.2	14.2	56.2	154.4	72.8
Roscommon	254.8	-	5.3	41.3	138.8	69.4
Wexford	259.3	2.9	10.4	53.8	126.4	65.8
Total	7,216.9	51.5	497.9	1,578.9	3,463.0	1,625.6

(Table 6 continued on next page)

(Table 6 continued)

Forest Survey Unit and county	All classes	Stocking class of growing-stock trees				
		Nonstocked[2]	Poorly stocked	Moderately stocked	Fully stocked	Over-stocked
Southern Lower Peninsula						
Allegan	178.4	-	18.6	33.0	87.2	39.6
Barry	111.2	-	9.8	27.8	52.2	21.4
Berrien	67.0	-	-	14.1	32.5	20.4
Branch	54.4	-	1.9	16.1	30.3	6.1
Calhoun	110.6	-	10.8	32.0	52.7	15.1
Cass	76.9	-	4.3	28.7	31.0	12.9
Clinton	53.8	-	11.8	24.0	18.0	-
Eaton	82.1	-	35.3	13.7	22.0	11.1
Genesee	64.9	-	18.0	19.6	14.9	12.4
Gratiot	49.2	-	6.5	14.8	27.9	-
Hillsdale	74.1	4.4	12.1	24.5	24.6	8.5
Huron	64.5	-	11.5	16.3	28.2	8.5
Ingham	62.0	-	6.8	22.7	32.5	-
Ionia	74.6	-	4.0	15.2	51.5	3.9
Jackson	82.3	-	10.7	28.7	34.8	8.1
Kalamazoo	75.0	1.3	3.1	11.8	41.3	17.5
Kent	155.5	1.1	17.2	48.4	63.7	25.1
Lapeer	109.4	-	21.9	62.5	15.1	9.9
Lenawee	55.2	4.4	2.2	8.8	32.8	7.0
Livingston	94.1	-	14.0	25.2	40.9	14.0
Macomb	60.6	25.7	1.4	11.3	15.9	6.3
Monroe	37.9	-	1.5	12.5	16.4	7.5
Montcalm	133.0	-	13.1	46.6	49.4	23.9
Muskegon	159.9	6.6	5.6	22.2	97.5	28.0
Oakland	111.2	2.6	21.4	42.9	35.6	8.7
Ottawa	79.1	7.7	7.0	23.4	32.6	8.4
Saginaw	98.9	-	5.2	26.7	52.2	14.8
St. Clair	78.3	-	1.9	19.8	39.4	17.2
St. Joseph	65.6	2.7	5.4	23.6	21.5	12.4
Sanilac	79.9	-	24.4	33.5	16.2	5.8
Shiawassee	50.2	3.0	-	11.0	21.7	14.5
Tuscola	115.5	-	24.0	29.2	53.7	8.6
Van Buren	122.3	2.5	15.6	34.0	50.4	19.8
Washtenaw	82.2	5.2	12.3	24.1	30.1	10.5
Wayne	30.9	-	4.1	10.3	11.8	4.7
Total	3,000.7	67.2	363.4	859.0	1,278.5	432.6
All counties	18,615.9	155.2	1,148.4	3,841.2	8,296.1	5,175.0

[1] This table is based on the stocking percent of growing-stock trees, rather than that of all live trees. For this table, to use the definition of stocking found in the Appendix, replace the term "all live" by "growing-stock."

[2] Area of nonstocked in this table and in Table 8 differs from that in other tables in this report because this table includes land stocked only with growing-stock trees, rather than with all live trees.

Table 7. -- Area of timberland by forest type group/local type and ownership class, Michigan, 1993

(In thousand acres)

Forest type group/ local type	All ownerships	Ownership class									
		Total public	Public				Total private	Private			
			National forest	Other federal	State	County and municipal		Indian	Forest industry	Individual	Corporate
White-red-jack pine											
Jack pine	846.1	575.0	208.3	15.3	333.3	18.1	271.1	-	7.4	210.2	53.5
Red pine	897.2	585.8	322.8	3.7	239.6	19.7	311.4	-	22.4	233.4	55.6
White pine	233.8	105.7	41.8	1.3	62.6	-	128.1	-	4.7	87.8	35.6
Total	1,977.1	1,266.5	572.9	20.3	635.5	37.8	710.6	-	34.5	531.4	144.7
Spruce-fir											
Balsam fir	563.1	215.5	91.3	5.2	112.5	6.5	347.6	-	91.2	180.1	76.3
White spruce	146.9	65.0	39.5	-	25.5	-	81.9	-	9.9	51.6	20.4
Black spruce	465.1	236.0	89.6	-	143.0	3.4	229.1	-	66.6	118.8	43.7
Northern white-cedar	1,349.4	524.5	145.0	-	362.9	16.6	824.9	1.6	195.8	504.3	123.2
Tamarack	148.9	65.8	19.5	-	41.1	5.2	83.1	-	13.3	51.6	18.2
Total	2,673.4	1,106.8	384.9	5.2	685.0	31.7	1,566.6	1.6	376.8	906.4	281.8
Oak-hickory											
Oak-hickory	1,981.8	726.2	271.5	-	422.0	32.7	1,255.6	-	9.8	1,077.1	168.7
Total	1,981.8	726.2	271.5	-	422.0	32.7	1,255.6	-	9.8	1,077.1	168.7
Elm-ash-cottonwood											
Elm-ash-soft maple	1,626.9	356.3	108.5	-	226.4	21.4	1,270.6	1.8	54.9	1,037.7	176.2
Total	1,626.9	356.3	108.5	-	226.4	21.4	1,270.6	1.8	54.9	1,037.7	176.2
Maple-beech-birch											
Maple-beech-birch	7,161.3	1,925.3	835.3	12.0	969.3	108.7	5,236.0	9.0	868.4	3,424.3	934.3
Total	7,161.3	1,925.3	835.3	12.0	969.3	108.7	5,236.0	9.0	868.4	3,424.3	934.3
Aspen-birch											
Aspen	2,675.7	1,034.7	329.2	11.1	671.2	23.2	1,641.0	1.3	127.2	1,221.3	291.2
Paper birch	291.5	95.2	19.2	1.0	75.0	-	196.3	0.9	24.8	120.8	49.8
Balsam poplar	189.7	48.8	20.9	-	27.9	-	140.9	-	17.9	110.8	12.2
Total	3,156.9	1,178.7	369.3	12.1	774.1	23.2	1,978.2	2.2	169.9	1,452.9	353.2
Nonstocked	38.5	16.7	-	-	15.9	0.8	21.8	-	-	18.7	3.1
All Types	18,615.9	6,576.5	2,542.4	49.6	3,728.2	256.3	12,039.4	14.6	1,514.3	8,448.5	2,062.0

Table 8. -- Area of timberland by ownership class and stocking class of growing-stock trees[1], Michigan, 1993

(In thousand acres)

Ownership class	All classes	Stocking class of growing-stock trees				
		Nonstocked [2]	Poorly stocked	Moderately stocked	Fully stocked	Over-stocked
Public						
National forest	2,542.4	2.9	87.9	420.6	970.0	1,061.0
Other federal	49.6	-	2.4	10.1	25.8	11.3
State	3,728.2	28.0	210.8	791.3	1,644.2	1,053.9
County and municipal	256.3	0.8	13.2	62.1	112.7	67.5
Total	6,576.5	31.7	314.3	1,284.1	2,752.7	2,193.7
Private						
Indian	14.6	-	-	1.8	1.3	11.5
Forest industry	1,514.3	-	33.7	252.4	723.3	504.9
Corporate	8,448.5	85.6	669.5	1,916.8	3,907.2	1,869.4
Individual	2,062.0	37.9	130.9	386.1	911.6	595.5
Total	12,039.4	123.5	834.1	2,557.1	5,543.4	2,981.3
All ownerships	18,615.9	155.2	1,148.4	3,841.2	8,296.1	5,175.0

[1] This table is based on the stocking percent of growing-stock trees, rather than that of all live trees. For this table, to use the definition of stocking found in the Appendix, replace the term "all live" by "growing-stock."

[2] Area of nonstocked in this table and in Table 6 differs from that in other tables in this report because this table includes land stocked only with growing-stock trees, rather than with all live trees.

Table 9. -- Area of timberland by forest type group/local type and stand-size class, Michigan, 1993

(In thousand acres)

Forest type group/ local type	All stands	Stand-size class			
		Sawtimber	Poletimber	Sapling-seedling	Nonstocked
White-red-jack pine					
Jack pine	846.1	258.0	349.6	238.5	-
Red pine	897.2	430.7	344.0	122.5	-
White pine	233.8	173.8	30.5	29.5	-
Total	1,977.1	862.5	724.1	390.5	-
Spruce-fir					
Balsam fir	563.1	177.3	158.2	227.6	-
White spruce	146.9	47.1	48.9	50.9	-
Black spruce	465.1	49.5	141.1	274.5	-
Northern white-cedar	1,349.4	594.8	582.2	172.4	-
Tamarack	148.9	31.5	40.2	77.2	-
Total	2,673.4	900.2	970.6	802.6	-
Oak-hickory					
Oak-hickory	1,981.8	1,230.0	457.1	294.7	-
Total	1,981.8	1,230.0	457.1	294.7	-
Elm-ash-cottonwood					
Elm-ash-soft maple	1,626.9	756.5	469.8	400.6	-
Total	1,626.9	756.5	469.8	400.6	-
Maple-beech-birch					
Maple-beech-birch	7,161.3	3,848.4	1,979.2	1,333.7	-
Total	7,161.3	3,848.4	1,979.2	1,333.7	-
Aspen-birch					
Aspen	2,675.7	850.7	720.6	1,104.4	-
Paper birch	291.5	90.4	166.8	34.3	-
Balsam poplar	189.7	66.2	53.1	70.4	-
Total	3,156.9	1,007.3	940.5	1,209.1	-
Nonstocked	38.5	-	-	-	38.5
All types	18,615.9	8,604.9	5,541.3	4,431.2	38.5

Table 10. -- Number of all live trees on timberland by species group and diameter class, Michigan, 1993

(In thousand trees)

Species group	All classes	Diameter class (inches at breast height)											
		1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods													
Jack pine	288,542	104,086	65,381	54,568	37,888	17,579	6,768	1,642	497	116	12	5	-
Red pine	348,613	43,930	70,267	98,771	77,758	32,564	13,815	6,007	2,717	1,513	742	528	1
White pine	188,278	83,758	39,930	24,366	12,617	9,427	6,119	3,806	2,607	1,965	1,320	2,138	225
White spruce	145,074	57,722	36,508	19,160	13,375	7,836	5,160	2,726	1,401	767	254	160	5
Black spruce	331,309	146,517	103,059	55,028	19,625	5,138	1,432	304	112	73	17	4	-
Balsam fir	1,100,257	654,086	270,746	105,912	44,905	18,066	4,640	1,472	319	87	13	11	-
Hemlock	111,348	31,035	21,252	15,539	10,320	9,856	7,677	5,748	4,402	2,474	1,366	1,593	86
Tamarack	110,457	47,842	30,674	17,872	8,203	3,508	1,500	522	226	77	21	8	4
Eastern redcedar	2,917	1,728	483	465	144	70	19	6	-	-	-	2	-
Northern white-cedar	1,015,683	327,251	282,615	204,787	110,738	51,529	22,126	9,963	3,829	1,730	666	438	11
Other softwoods	60,929	14,258	19,442	14,080	8,387	3,522	966	174	87	-	13	-	-
Total softwoods	3,703,407	1,512,213	940,357	610,548	343,960	159,095	70,222	32,370	16,197	8,802	4,424	4,887	332
Hardwoods													
Select white oak	172,982	65,379	33,501	25,175	15,481	12,271	7,227	5,278	3,331	2,184	1,212	1,634	309
Other white oak	458	261	45	29	33	90	-	-	-	-	-	-	-
Select red oak	260,453	105,490	33,085	30,307	23,981	22,511	17,409	11,719	6,434	3,935	2,543	2,794	245
Other red oak	79,867	30,280	11,984	11,730	7,588	6,279	4,415	2,805	2,180	1,199	713	609	85
Select hickory	19,956	9,676	2,946	1,926	1,382	1,493	1,069	760	379	171	85	68	1
Other hickory	18,187	8,713	3,394	2,090	1,277	1,005	856	438	201	134	53	26	-
Basswood	147,903	45,971	22,043	19,615	20,573	16,392	11,953	5,863	2,958	1,361	603	547	24
Beech	137,560	74,176	21,910	13,818	8,185	6,050	3,986	3,134	2,553	1,587	891	1,191	79
Yellow birch	160,266	58,027	37,954	24,251	14,220	9,734	5,939	3,868	2,766	1,566	800	1,050	91
Hard maple	1,526,564	720,643	315,478	219,318	118,321	70,387	37,916	19,505	11,602	6,626	3,262	3,249	257
Soft maple	1,427,221	678,184	313,495	185,195	110,295	66,030	34,961	18,116	10,000	5,302	2,528	2,763	352
Elm	260,689	145,211	66,421	24,813	12,253	6,640	2,908	1,281	659	281	89	131	2
Black ash	365,994	203,899	94,423	39,829	16,554	6,258	2,790	1,432	497	199	63	50	-
White & green ash	327,105	176,841	63,024	34,505	21,959	12,484	7,738	4,693	2,928	1,570	649	648	66
Sycamore	999	288	-	156	24	149	116	61	20	64	12	86	23
Cottonwood	11,766	2,617	1,997	1,991	1,201	848	803	691	609	382	191	328	108
Willow	9,161	3,462	1,535	1,282	761	540	468	283	347	141	113	177	52
Hackberry	2,609	1,018	844	535	112	49	12	11	9	19	-	-	-
Balsam poplar	113,501	59,582	19,869	12,252	7,382	6,212	3,347	2,185	1,310	656	339	357	10
Bigtooth aspen	394,892	204,333	73,095	37,018	26,615	22,431	16,087	9,227	3,690	1,460	577	353	6
Quaking aspen	1,062,811	625,602	193,935	94,609	55,930	40,869	26,260	13,510	7,083	3,245	1,028	734	6
Paper birch	263,755	77,349	59,989	54,850	35,471	21,157	9,386	3,547	1,286	462	139	113	6
Tupelo	3,920	1,557	826	962	293	159	29	69	-	-	-	25	-
Black cherry	297,353	187,473	41,336	26,918	18,025	11,441	5,881	3,405	1,494	819	286	266	9
Black walnut	8,375	2,274	1,263	1,615	1,049	901	526	348	161	122	55	53	8
Butternut	2,507	639	1,059	161	240	115	158	69	29	19	6	12	-
Yellow-poplar	3,188	903	501	499	167	259	267	158	165	60	116	87	6
Sassafras	70,096	42,742	14,411	6,811	3,472	1,402	779	334	97	44	-	4	-
Other hardwoods	59,525	42,620	7,449	4,840	2,504	1,090	624	195	124	25	42	9	3
Total hardwoods	7,209,663	3,575,210	1,437,812	877,100	525,348	345,246	203,910	112,985	62,912	33,633	16,395	17,364	1,748
Noncommercial species	493,902	376,571	83,486	23,928	6,876	2,228	580	165	24	4	11	25	4
All species	11,406,972	5,463,994	2,461,655	1,511,576	876,184	506,569	274,712	145,520	79,133	42,439	20,830	22,276	2,084

Table 11. -- Number of growing-stock trees on timberland by species group and diameter class, Michigan, 1993

(In thousand trees)

Species group	All classes	Diameter class (inches at breast height)											
		1.0-2.9	3.0-4.9	5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods													
Jack pine	275,352	102,416	61,926	50,769	35,786	16,229	6,230	1,507	380	98	7	4	-
Red pine	341,718	43,345	68,272	97,041	76,183	31,875	13,644	5,936	2,676	1,495	730	520	1
White pine	181,399	83,275	38,508	22,952	11,419	8,434	5,667	3,457	2,413	1,799	1,257	2,012	206
White spruce	143,357	57,515	36,118	18,661	13,138	7,658	5,021	2,685	1,401	752	251	155	2
Black spruce	325,896	144,085	101,469	54,245	19,172	5,015	1,407	299	110	73	17	4	-
Balsam fir	1,091,019	650,895	267,790	104,220	44,181	17,687	4,469	1,366	307	83	10	11	-
Hemlock	101,753	30,670	20,186	13,803	8,821	7,903	6,489	5,020	3,841	2,271	1,240	1,436	73
Tamarack	106,104	46,883	29,612	16,753	7,570	3,167	1,355	480	191	70	19	4	-
Eastern redcedar	2,687	1,530	483	465	144	48	9	6	-	-	-	2	-
Northern white-cedar	933,138	317,490	264,824	183,726	96,437	41,771	16,815	7,383	2,819	1,176	425	266	6
Other softwoods	54,418	13,937	17,084	12,916	6,657	2,804	774	155	79	-	12	-	-
Total softwoods	3,556,841	1,492,041	906,272	575,551	319,508	142,591	61,880	28,294	14,217	7,817	3,968	4,414	288
Hardwoods													
Select white oak	164,779	64,450	31,037	24,040	14,621	11,425	6,724	4,812	3,069	1,964	1,046	1,391	200
Other white oak	413	261	45	29	33	45	-	-	-	-	-	-	-
Select red oak	249,991	105,367	31,327	28,132	22,762	21,104	15,856	10,898	5,889	3,679	2,351	2,451	175
Other red oak	74,328	30,031	10,535	10,458	6,812	5,745	3,928	2,496	2,017	1,095	625	524	62
Select hickory	19,500	9,490	2,946	1,886	1,340	1,493	1,004	684	365	171	52	68	1
Other hickory	18,034	8,713	3,394	2,090	1,194	998	856	405	201	120	44	19	-
Basswood	140,719	45,614	20,481	18,161	19,462	15,442	11,169	5,410	2,727	1,241	569	430	13
Beech	126,251	71,519	20,280	12,477	6,994	4,908	3,172	2,303	1,838	1,243	634	831	52
Yellow birch	136,774	54,886	33,333	19,388	10,613	7,345	4,327	2,672	2,047	1,031	538	568	26
Hard maple	1,446,448	698,371	298,703	205,172	109,258	63,358	33,083	16,943	10,189	5,721	2,853	2,663	134
Soft maple	1,350,757	667,354	292,078	169,456	100,399	58,851	29,948	15,583	8,439	4,278	2,033	2,127	211
Elm	250,438	143,718	61,936	23,178	10,973	6,176	2,488	1,036	528	233	85	86	1
Black ash	343,723	197,899	86,434	35,248	14,247	5,430	2,417	1,329	449	168	60	42	-
White & green ash	317,394	175,779	59,493	32,644	20,765	11,836	7,053	4,347	2,742	1,492	588	607	48
Sycamore	884	288	-	49	24	149	116	61	20	64	12	82	19
Cottonwood	11,024	2,479	1,715	1,961	1,036	826	777	670	582	379	179	318	102
Willow	7,402	3,360	1,319	807	597	398	251	187	212	75	74	99	23
Hackberry	2,609	1,018	844	535	112	49	12	11	9	19	-	-	-
Balsam poplar	108,983	58,820	18,561	11,427	6,881	5,763	3,079	2,054	1,154	603	305	326	10
Bigtooth aspen	382,689	203,381	70,320	34,036	24,839	21,292	15,166	8,459	3,306	1,187	474	227	2
Quaking aspen	1,021,830	620,845	185,244	86,072	50,487	36,549	22,315	11,188	5,573	2,390	693	469	5
Paper birch	243,958	75,345	55,410	49,451	31,970	19,046	8,069	3,077	1,057	373	106	54	-
Tupelo	3,556	1,503	826	905	166	65	13	61	-	-	-	17	-
Black cherry	265,095	182,412	31,755	20,653	12,819	8,525	4,291	2,482	1,136	588	214	211	9
Black walnut	7,966	2,274	1,197	1,560	965	799	511	307	161	111	47	34	-
Butternut	2,262	639	1,059	72	169	91	133	48	29	15	6	1	-
Yellow-poplar	3,178	903	501	499	167	259	267	158	165	60	109	87	3
Sassafras	63,862	42,457	11,838	5,064	2,555	1,051	536	243	97	17	-	4	-
Other hardwoods	53,670	41,696	5,778	3,437	1,660	649	296	63	73	9	-	9	-
Total hardwoods	6,818,517	3,510,872	1,338,389	798,887	473,920	309,667	177,857	97,987	54,074	28,326	13,697	13,745	1,096
All species	10,375,358	5,002,913	2,244,661	1,374,438	793,428	452,258	239,737	126,281	68,291	36,143	17,665	18,159	1,384

Table 12. -- Net volume of growing stock on timberland by species group and diameter class, Michigan, 1993

(In thousand cubic feet)

Species group	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods											
Jack pine	603,319	116,849	185,862	153,521	94,975	34,556	12,454	4,419	433	250	-
Red pine	1,626,692	268,878	443,603	321,915	219,097	139,941	88,323	64,877	40,782	39,116	160
White pine	869,620	51,571	60,211	83,214	91,785	84,721	86,031	86,905	79,371	202,505	43,306
White spruce	494,221	48,900	81,842	84,450	90,312	71,617	51,598	36,285	15,270	13,671	276
Black spruce	365,055	152,618	116,697	54,794	24,356	7,810	3,831	3,641	1,045	263	-
Balsam fir	822,551	262,681	255,564	182,399	73,654	32,778	10,178	3,817	561	919	-
Hemlock	661,724	22,544	35,780	61,856	83,387	98,592	105,872	83,634	58,078	100,984	10,997
Tamarack	180,922	49,652	48,120	35,539	23,903	12,473	6,574	3,242	1,051	368	-
Eastern redcedar	2,931	1,169	849	465	174	126	-	-	-	148	-
Northern white-cedar	1,832,717	422,903	490,348	373,532	235,104	150,438	79,406	43,307	20,015	16,890	774
Other softwoods	112,318	30,236	35,213	27,909	11,905	3,689	2,703	-	663	-	-
Total softwoods	7,572,070	1,428,001	1,754,089	1,379,594	948,652	636,741	446,970	330,127	217,269	375,114	55,513
Hardwoods											
Select white oak	819,566	56,480	77,453	107,013	100,476	104,513	93,039	80,440	54,838	110,875	34,439
Other white oak	644	71	178	395	-	-	-	-	-	-	-
Select red oak	1,604,647	65,993	125,538	206,719	244,869	249,638	188,025	157,438	129,257	205,221	31,949
Other red oak	397,604	23,102	34,271	53,090	55,665	53,004	58,729	41,633	31,245	37,947	8,918
Select hickory	92,659	4,573	7,757	15,299	16,727	17,569	13,064	8,319	3,010	6,099	242
Other hickory	65,120	4,480	6,848	10,326	15,229	10,267	7,392	6,239	2,594	1,745	-
Basswood	903,635	53,149	124,197	174,075	195,764	137,405	93,861	55,087	32,312	34,517	3,268
Beech	477,377	36,042	44,891	57,584	56,416	57,569	63,019	54,240	35,037	65,476	7,103
Yellow birch	498,381	51,638	63,962	76,916	68,621	61,186	63,584	41,261	26,962	40,917	3,334
Hard maple	4,042,740	573,338	705,537	725,899	586,350	435,230	355,409	261,128	162,239	216,336	21,274
Soft maple	3,452,234	456,263	627,829	651,145	518,065	387,439	287,439	190,197	114,591	176,269	42,997
Elm	282,103	55,234	60,334	64,297	40,217	24,231	16,754	9,750	4,422	6,720	144
Black ash	338,088	91,895	84,438	58,134	41,447	32,943	14,830	7,458	3,442	3,501	-
White & green ash	814,075	82,498	120,778	124,110	119,722	108,215	93,794	69,010	34,626	52,623	8,699
Sycamore	23,004	207	149	1,678	2,191	1,822	712	3,428	754	8,068	3,995
Cottonwood	131,894	3,359	5,347	8,347	12,206	14,873	18,840	15,837	9,403	27,193	16,489
Willow	43,316	1,827	3,068	3,697	3,708	4,266	6,364	3,074	3,999	9,044	4,269
Hackberry	4,628	1,647	788	492	177	342	354	828	-	-	-
Balsam poplar	345,096	30,364	40,832	62,572	51,006	49,753	39,081	26,483	17,853	25,453	1,699
Bigtooth aspen	1,236,719	99,530	166,227	246,442	274,687	224,219	121,325	57,008	28,776	18,221	284
Quaking aspen	1,971,082	226,512	304,934	397,251	384,181	279,625	192,562	108,504	38,786	37,879	848
Paper birch	844,859	144,501	206,112	213,194	140,379	76,899	36,554	17,031	6,040	4,149	-
Tupelo	6,192	2,316	895	580	209	1,236	-	-	-	956	-
Black cherry	496,151	61,773	88,249	102,316	79,467	66,551	40,602	27,480	12,636	15,948	1,129
Black walnut	54,445	4,363	6,747	9,056	9,520	8,433	5,680	4,969	2,868	2,809	-
Butternut	8,718	289	1,232	1,253	2,598	1,422	1,148	450	237	89	-
Yellow-poplar	38,756	1,261	947	2,996	4,674	4,432	6,073	3,034	6,804	8,139	396
Sassafras	48,629	9,978	13,373	9,354	7,388	4,675	2,780	706	-	375	-
Other hardwoods	30,453	7,471	8,315	5,876	4,175	1,431	2,196	363	-	626	-
Total hardwoods	19,072,815	2,150,154	2,931,226	3,390,106	3,036,134	2,419,188	1,823,210	1,251,395	762,731	1,117,195	191,476
All species	26,644,885	3,578,155	4,685,315	4,769,700	3,984,786	3,055,929	2,270,180	1,581,522	980,000	1,492,309	246,989

Table 13. -- Net volume of growing stock in the saw-log portion of sawtimber trees on timberland by species group and diameter class, Michigan, 1993

(In thousand cubic feet)

Species group	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods									
Jack pine	254,513	125,085	82,882	30,775	11,180	3,975	390	226	-
Red pine	831,900	282,677	202,207	130,341	82,253	60,273	37,807	36,195	147
White pine	649,315	64,523	76,981	72,839	74,554	75,580	69,227	177,340	38,271
White spruce	327,905	72,398	81,858	65,763	47,510	33,433	14,072	12,615	256
Black spruce	88,622	49,832	23,061	7,424	3,636	3,437	984	248	-
Balsam fir	254,138	147,393	63,878	29,032	9,083	3,420	505	827	-
Hemlock	527,532	49,332	71,381	86,427	93,666	74,367	51,832	90,575	9,952
Tamarack	73,442	30,233	21,509	11,395	6,026	2,975	966	338	-
Eastern redcedar	780	374	156	114	-	-	-	136	-
Northern white-cedar	782,342	301,786	203,707	133,260	70,919	38,798	17,968	15,203	701
Other softwoods	39,286	22,659	10,334	3,280	2,418	-	595	-	-
Total softwoods	3,829,775	1,146,292	837,954	570,650	401,245	296,258	194,346	333,703	49,327
Hardwoods									
Select white oak	421,671	-	64,195	74,150	68,699	60,476	41,701	85,421	27,029
Select red oak	877,696	-	157,513	178,226	139,732	119,282	99,016	158,699	25,228
Other red oak	210,146	-	35,705	37,904	43,931	31,836	24,085	29,630	7,055
Select hickory	43,357	-	9,526	11,667	9,157	5,989	2,225	4,599	194
Other hickory	28,544	-	8,854	6,790	5,185	4,483	1,913	1,319	-
Basswood	401,013	-	131,074	101,088	71,427	42,581	25,124	27,098	2,621
Beech	261,616	-	38,330	43,199	49,338	43,287	28,272	53,325	5,865
Yellow birch	232,114	-	46,075	45,953	49,570	32,819	21,664	33,274	2,759
Hard maple	1,465,951	-	376,903	312,486	266,100	199,439	125,286	168,850	16,887
Soft maple	1,213,127	-	326,662	273,350	212,181	143,320	87,411	136,197	34,006
Elm	68,229	-	24,171	16,492	11,975	7,124	3,285	5,070	112
Black ash	76,056	-	28,438	24,770	11,490	5,840	2,729	2,789	-
White & green ash	357,015	-	79,795	79,053	70,808	52,768	26,726	40,985	6,880
Sycamore	16,464	-	1,495	1,378	559	2,705	602	6,471	3,254
Cottonwood	81,606	-	7,056	9,688	13,145	11,407	6,910	20,526	12,874
Willow	24,706	-	2,121	2,797	4,444	2,199	2,940	6,851	3,354
Hackberry	1,207	-	105	239	254	609	-	-	-
Balsam poplar	155,974	-	34,459	36,580	29,688	20,365	13,775	19,774	1,333
Bigtooth aspen	531,675	-	189,022	167,572	93,371	44,469	22,621	14,394	226
Quaking aspen	761,753	-	261,884	207,540	147,465	84,135	30,338	29,718	673
Paper birch	192,264	-	90,386	54,582	26,877	12,715	4,549	3,155	-
Tupelo	1,816	-	148	891	-	-	-	777	-
Black cherry	172,493	-	51,060	47,530	30,155	20,822	9,660	12,369	897
Black walnut	25,578	-	6,472	6,316	4,398	3,903	2,248	2,241	-
Butternut	4,346	-	1,764	1,067	890	361	194	70	-
Yellow-poplar	25,580	-	3,145	3,295	4,651	2,366	5,346	6,460	317
Sassafras	11,243	-	4,870	3,421	2,118	541	-	293	-
Other hardwoods	6,299	-	2,803	1,064	1,664	278	-	490	-
Total hardwoods	7,669,539	-	1,984,031	1,749,088	1,369,272	956,119	588,620	870,845	151,564
All species	11,499,314	1,146,292	2,821,985	2,319,738	1,770,517	1,252,377	782,966	1,204,548	200,891

Table 14. -- Net volume of sawtimber on timberland by species group and diameter class, Michigan, 1993

(In thousand board feet)[1]

Species group	All classes	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods									
Jack pine	1,474,600	734,438	468,300	177,284	66,371	24,329	2,442	1,436	-
Red pine	4,791,938	1,619,442	1,125,667	740,158	481,306	362,361	232,787	229,239	978
White pine	3,973,439	380,321	432,791	416,845	439,977	459,582	431,862	1,151,747	260,314
White spruce	1,950,136	427,895	471,114	386,002	286,231	206,480	88,735	81,955	1,724
Black spruce	508,901	284,596	130,297	43,168	21,757	21,247	6,240	1,596	-
Balsam fir	1,481,028	867,587	362,501	167,584	53,946	20,920	3,144	5,346	-
Hemlock	3,154,012	296,485	401,993	492,117	548,237	447,829	319,990	580,126	67,235
Tamarack	430,682	177,311	123,604	66,873	36,261	18,353	6,085	2,195	-
Eastern redcedar	4,877	2,372	932	686	-	-	-	887	-
Northern white-cedar	4,696,896	1,855,182	1,187,143	780,451	423,767	236,723	111,943	96,994	4,693
Other softwoods	226,052	131,164	57,993	18,843	14,329	-	3,723	-	-
Total softwoods	22,692,561	6,776,793	4,762,335	3,290,011	2,372,182	1,797,824	1,206,951	2,151,521	334,944
Hardwoods									
Select white oak	2,659,883	-	404,673	452,678	421,129	376,346	263,891	556,890	184,276
Select red oak	5,513,432	-	990,813	1,086,603	857,056	743,410	627,608	1,035,653	172,289
Other red oak	1,320,026	-	227,519	232,046	269,803	198,223	152,316	192,380	47,739
Select hickory	271,408	-	60,942	71,368	56,283	37,400	14,097	29,991	1,327
Other hickory	178,167	-	55,992	41,575	31,879	28,011	12,107	8,603	-
Basswood	2,504,525	-	822,723	620,314	441,036	266,482	159,644	176,250	18,076
Beech	1,676,951	-	247,578	271,833	310,895	275,269	181,899	349,849	39,628
Yellow birch	1,473,171	-	296,534	286,510	309,417	206,865	138,172	216,997	18,676
Hard maple	9,282,920	-	2,408,570	1,941,376	1,658,768	1,257,683	800,316	1,101,775	114,432
Soft maple	7,708,538	-	2,096,255	1,701,152	1,323,657	903,931	558,722	891,484	233,337
Elm	431,468	-	155,606	102,275	74,275	44,646	20,911	33,005	750
Black ash	475,217	-	179,281	152,599	71,100	36,616	17,384	18,237	-
White & green ash	2,214,657	-	491,215	477,975	432,986	328,666	169,431	267,338	47,046
Sycamore	107,688	-	9,390	8,526	3,494	17,223	3,873	42,824	22,358
Cottonwood	520,161	-	44,855	59,183	80,417	70,717	43,507	133,799	87,683
Willow	157,770	-	13,622	17,102	27,161	13,619	18,529	44,853	22,884
Hackberry	7,544	-	680	1,472	1,582	3,810	-	-	-
Balsam poplar	977,493	-	216,198	224,399	183,664	127,623	87,830	128,711	9,068
Bigtooth aspen	3,293,765	-	1,174,224	1,024,055	576,740	279,196	144,315	93,715	1,520
Quaking aspen	4,736,558	-	1,635,170	1,270,987	911,209	527,802	193,049	193,754	4,587
Paper birch	1,209,190	-	573,710	338,108	167,374	80,286	29,127	20,585	-
Tupelo	11,271	-	911	5,397	-	-	-	4,963	-
Black cherry	1,087,087	-	326,243	295,115	187,520	130,868	61,506	79,857	5,978
Black walnut	160,994	-	41,074	39,126	27,372	24,517	14,321	14,584	-
Butternut	27,239	-	11,157	6,600	5,557	2,251	1,219	455	-
Yellow-poplar	162,735	-	19,716	20,229	28,842	14,943	34,267	42,586	2,152
Sassafras	69,742	-	30,660	20,837	12,949	3,369	-	1,927	-
Other hardwoods	39,053	-	17,519	6,460	10,168	1,727	-	3,179	-
Total hardwoods	48,278,653	-	12,552,830	10,775,900	8,482,333	6,001,499	3,748,041	5,684,244	1,033,806
All species	70,971,214	6,776,793	17,315,165	14,065,911	10,854,515	7,799,323	4,954,992	7,835,765	1,368,750

[1]International 1/4-inch rule.

Table 15. -- Net volume of sawtimber on timberland by species group, grade, diameter class, and Forest Survey Unit, Michigan, 1993

(In thousand board feet)[1]

Eastern Upper Peninsula

Species group	Log grade 1					Log grade 2					Log grade 3					Log grade 4				
		Diameter class (inches at breast height)					Diameter class (inches at breast height)					Diameter class (inches at breast height)					Diameter class (inches at breast height)			
	Total	9.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	9.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	9.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	9.0-14.9	15.0-18.9	19.0-20.9	21.0+
Softwoods																				
Jack pine	-	-	-	-	-	1,640	1,582	53	5	-	443,495	427,630	14,434	1,431	-	-	-	-	-	-
Red pine	13,476	1,510	7,374	4,592	-	35,835	16,156	16,577	3,102	-	1,061,372	820,962	164,805	65,638	9,967	-	-	-	-	-
White pine	201,314	2,154	40,898	74,513	83,749	260,120	71,630	76,780	42,072	69,638	405,560	150,866	92,400	90,214	72,080	203,755	96,098	42,341	22,643	42,673
White spruce	1,168	-	1,168	-	-	13,683	5,804	7,879	-	-	601,126	421,847	129,192	37,927	12,160	-	-	-	-	-
Black spruce	-	-	-	-	-	1,995	1,995	-	-	-	188,651	174,697	8,405	5,549	-	-	-	-	-	-
Balsam fir	-	-	-	-	-	-	-	-	-	-	457,685	423,974	31,207	2,504	-	-	-	-	-	-
Hemlock	48,238	-	20,331	18,155	9,752	113,228	22,477	46,735	35,368	8,648	633,790	308,809	169,107	69,341	86,533	-	-	-	-	-
Tamarack	-	-	-	-	-	13,906	5,892	8,014	-	-	101,506	99,190	-	2,316	-	-	-	-	-	-
Eastern redcedar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Northern white-ceda	7,606	-	2,369	5,237	-	28,007	18,692	9,315	-	-	1,787,436	1,549,709	200,331	30,288	7,108	-	-	-	-	-
Other softwoods	-	-	-	-	-	-	-	-	-	-	15,212	14,682	530	-	-	-	-	-	-	-
Total	271,802	3,664	72,140	102,497	93,501	468,414	144,228	165,353	80,547	78,286	5,695,833	4,392,366	810,411	305,208	187,848	203,755	96,098	42,341	22,643	42,673

Species group	Tree grade 1					Tree grade 2					Tree grade 3					Tie and timber				
		Diameter class (inches at breast height)					Diameter class (inches at breast height)					Diameter class (inches at breast height)					Diameter class (inches at breast height)			
	Total	11.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	11.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	11.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	11.0-14.9	15.0-18.9	19.0-20.9	21.0+
Hardwoods																				
Select white oak	-	-	-	-	-	-	-	-	-	-	2,354	1,043	543	768	-	-	-	-	-	-
Select red oak	12,477	-	-	6,227	6,250	37,780	8,920	16,893	11,967	-	22,690	17,834	4,856	-	-	30,378	20,387	9,991	-	-
Other red oak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Select hickory	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other hickory	-	-	-	-	-	-	-	-	-	-	1,138	341	-	-	797	-	-	-	-	-
Basswood	45,313	3,795	25,821	12,453	3,244	67,996	39,950	28,046	-	-	61,873	55,636	-	4,338	1,899	3,380	3,380	-	-	-
Beech	60,609	-	31,097	18,535	10,977	243,020	97,041	91,846	37,353	16,780	263,505	110,265	111,714	41,526	-	169,108	73,438	62,478	26,644	6,548
Yellow birch	42,561	-	28,063	11,239	3,259	125,591	38,665	50,096	27,588	9,242	143,256	80,693	46,437	9,618	6,508	30,392	11,865	7,007	3,975	7,545
Hard maple	173,008	-	76,495	74,289	22,224	586,972	198,329	266,042	64,892	57,709	763,981	573,429	143,294	47,258	-	181,132	132,489	39,514	9,129	-
Soft maple	85,239	-	54,244	27,874	3,121	350,576	146,652	169,229	25,414	9,281	622,620	415,094	116,114	78,525	12,887	204,652	133,963	40,509	16,145	14,015
Elm	-	-	-	-	-	6,792	-	5,514	1,137	141	13,939	8,739	-	4,629	571	-	-	-	-	-
Black ash	2,294	-	-	2,294	-	21,022	18,702	2,320	-	-	32,374	30,518	1,856	-	-	5,135	-	5,135	-	-
White & green ash	43,021	-	26,353	11,896	4,772	16,290	16,290	-	-	-	31,607	23,493	8,114	-	-	3,084	3,084	-	-	-
Sycamore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cottonwood	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,442	362	2,080	-	-
Willow	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	485	-	485	-	-
Hackberry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Balsam poplar	29,486	-	18,354	4,678	6,454	115,006	52,875	49,368	12,763	-	156,469	114,944	26,182	15,343	-	70,261	49,741	12,976	7,544	-
Bigtooth aspen	26,628	-	13,659	12,580	389	38,133	8,510	29,272	-	351	97,428	83,874	-	12,543	1,009	25,487	10,487	14,768	-	232
Quaking aspen	80,605	-	56,680	10,916	13,009	272,405	136,747	112,986	22,672	-	417,696	326,490	73,847	17,359	-	136,160	107,833	28,327	-	-
Paper birch	8,884	-	4,346	4,498	40	91,907	56,047	35,448	-	412	209,839	196,930	11,969	-	940	44,256	34,063	9,995	-	198
Tupelo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Black cherry	2,477	-	2,356	104	17	54,369	36,650	15,080	2,269	370	60,826	47,612	10,281	2,540	413	6,158	3,422	2,437	257	42
Black walnut	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Butternut	-	-	-	-	-	677	-	677	-	-	1,866	1,204	662	-	-	-	-	-	-	-
Yellow-poplar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sassafras	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other hardwoods	-	-	-	-	-	145	145	-	-	-	401	401	-	-	-	-	-	-	-	-
Total	612,602	3,795	337,468	197,583	73,756	2,030,681	857,523	872,817	206,055	94,286	2,903,860	2,088,540	555,849	234,447	25,024	912,510	584,534	235,702	63,694	28,580
All species	884,404	7,459	409,608	300,080	167,257	2,499,095	1,001,751	1,038,170	286,602	172,572	8,599,693	6,480,906	1,366,260	539,655	212,872	1,116,265	680,632	278,043	86,337	71,253

(Table 15 continued on next page)

(Table 15 continued)

Western Upper Peninsula

Species group	Log grade 1					Log grade 2					Log grade 3					Log grade 4				
		Diameter class (inches at breast height)					Diameter class (inches at breast height)					Diameter class (inches at breast height)					Diameter class (inches at breast height)			
	Total	9.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	9.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	9.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	9.0-14.9	15.0-18.9	19.0-20.9	21.0+
Softwoods																				
Jack pine	-	-	-	-	-	6,789	6,759	-	30	-	335,350	283,399	50,575	1,376	-	-	-	-	-	-
Red pine	122,273	40,644	61,703	19,926	-	32,941	8,164	17,320	4,181	3,276	411,443	326,579	28,377	35,821	20,666	-	-	-	-	-
White pine	161,695	4,788	43,296	37,272	76,339	297,139	74,320	69,027	60,749	93,043	528,244	131,231	120,617	149,384	127,012	81,858	23,021	10,989	22,281	25,567
White spruce	-	-	-	-	-	25,210	6,685	2,421	1,706	14,398	1,096,882	697,207	312,818	86,857	-	-	-	-	-	-
Black spruce	-	-	-	-	-	-	-	-	-	-	253,541	223,324	27,933	2,284	-	-	-	-	-	-
Balsam fir	-	-	-	-	-	-	-	-	-	-	772,432	733,265	33,181	2,593	3,393	-	-	-	-	-
Hemlock	28,113	-	11,743	5,113	11,257	170,664	20,241	62,011	64,713	23,699	1,709,947	603,190	564,457	328,416	213,884	-	-	-	-	-
Tamarack	-	-	-	-	-	12,715	6,085	3,253	3,266	111	146,139	120,626	23,300	1,187	1,026	-	-	-	-	-
Eastern redcedar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Northern white-ceda	-	-	-	-	-	32,149	20,184	11,965	-	-	1,573,703	1,109,016	320,146	118,690	25,851	-	-	-	-	-
Other softwoods	-	-	-	-	-	-	-	-	-	-	3,679	3,099	580	-	-	-	-	-	-	-
Total	312,081	45,432	116,742	62,311	87,596	577,607	142,438	165,997	134,645	134,527	6,831,360	4,230,936	1,481,984	726,608	391,832	81,858	23,021	10,989	22,281	25,567

Species group	Tree grade 1					Tree grade 2					Tree grade 3					Tie and timber				
		Diameter class (inches at breast height)					Diameter class (inches at breast height)					Diameter class (inches at breast height)					Diameter class (inches at breast height)			
	Total	11.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	11.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	11.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	11.0-14.9	15.0-18.9	19.0-20.9	21.0+
Hardwoods																				
Select white oak	-	-	-	-	-	-	-	-	-	-	2,739	2,739	-	-	-	-	-	-	-	-
Select red oak	78,664	-	22,052	36,138	20,474	113,354	38,026	55,404	17,507	2,417	150,210	103,056	30,318	11,290	5,546	28,862	12,688	16,174	-	-
Other red oak	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Select hickory	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other hickory	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Basswood	141,463	4,154	91,959	30,587	14,763	223,562	136,230	67,072	14,270	5,990	394,264	342,018	35,389	16,857	-	21,633	18,048	3,585	-	-
Beech	204	-	204	-	-	322	-	322	-	-	567	127	440	-	-	31	31	-	-	-
Yellow birch	167,822	-	84,888	52,916	30,018	248,273	104,283	100,635	37,156	6,199	529,378	248,151	138,084	80,730	62,413	38,293	24,097	14,196	-	-
Hard maple	639,399	-	323,565	187,167	128,667	1,437,841	474,455	606,494	305,149	51,743	2,264,556	1,445,418	495,603	234,419	89,116	343,750	183,324	84,157	48,191	28,078
Soft maple	79,902	-	48,068	16,269	15,565	357,882	184,506	136,706	36,670	-	985,290	638,580	254,750	79,983	11,977	137,286	81,848	21,458	9,563	24,417
Elm	115,494	47,458	39,975	14,396	13,665	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Black ash	17,344	-	15,692	-	1,652	68,702	38,412	20,034	10,256	-	111,163	99,266	11,897	-	-	3,916	3,916	-	-	-
White & green ash	32,370	-	18,883	13,487	-	52,604	31,826	20,778	-	-	39,006	39,006	-	-	-	-	-	-	-	-
Sycamore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Cottonwood	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Willow	485	485	-	-	-	787	251	536	-	-	584	128	456	-	-	-	-	-	-	-
Hackberry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Balsam poplar	49,337	-	25,124	15,614	8,599	58,125	17,513	19,995	13,700	6,917	67,815	44,161	15,238	6,130	2,286	7,922	7,922	-	-	-
Bigtooth aspen	77,573	-	65,352	12,221	-	139,382	72,629	45,659	21,094	-	202,987	148,776	35,982	6,287	11,942	13,489	13,489	-	-	-
Quaking aspen	59,463	-	47,922	10,914	627	317,086	146,720	141,057	25,074	4,235	1,263,772	822,724	341,543	81,293	18,212	178,914	155,350	20,742	-	2,822
Paper birch	16,694	-	11,509	4,961	224	129,579	75,543	44,294	7,605	2,137	280,138	236,260	38,974	-	4,904	23,764	20,288	3,060	-	416
Tupelo	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Black cherry	3,242	-	3,242	-	-	42,169	28,432	9,502	3,677	558	51,793	47,438	4,355	-	-	8,957	1,422	7,535	-	-
Black walnut	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Butternut	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Yellow-poplar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sassafras	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Other hardwoods	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	1,479,456	52,097	798,435	394,670	234,254	3,189,668	1,348,826	1,268,488	492,158	80,196	6,344,262	4,217,848	1,403,029	516,989	206,396	806,817	522,423	170,907	57,754	55,733
All species	1,791,537	97,529	915,177	456,981	321,850	3,767,275	1,491,264	1,434,485	626,803	214,723	13,175,622	8,448,784	2,885,013	1,243,597	598,228	888,675	545,444	181,896	80,035	81,300

(Table 15 continued on next page)

(Table 15 continued)

Northern Lower Peninsula

Species group	Log grade 1					Log grade 2					Log grade 3					Log grade 4				
		Diameter class (inches at breast height)					Diameter class (inches at breast height)					Diameter class (inches at breast height)					Diameter class (inches at breast height)			
	Total	9.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	9.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	9.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	9.0-14.9	15.0-18.9	19.0-20.9	21.0+
Softwoods																				
Jack pine	3,103	3,103	-	-	-	-	-	-	-	-	650,667	624,071	25,560	1,036	-	-	-	-	-	-
Red pine	124,513	7,323	64,072	45,473	7,645	167,108	61,441	83,885	16,099	5,683	2,537,323	1,971,140	349,706	180,780	35,697	-	-	-	-	-
White pine	150,692	4,870	47,642	28,705	69,475	309,296	97,367	67,075	85,777	59,077	738,021	330,741	165,897	127,084	114,299	198,567	71,448	45,956	41,205	39,958
White spruce	10,471	-	10,036	182	253	23,970	22,323	-	691	956	153,284	116,766	26,743	4,101	5,674	-	-	-	-	-
Black spruce	-	-	-	-	-	2,675	2,675	-	-	-	62,039	55,375	6,664	-	-	-	-	-	-	-
Balsam fir	-	-	-	-	-	10,514	10,514	-	-	-	238,394	227,898	10,496	-	-	-	-	-	-	-
Hemlock	10,217	-	2,950	7,267	-	35,806	4,294	12,452	-	19,060	363,458	182,525	93,264	54,378	33,291	-	-	-	-	-
Tamarack	2,980	-	2,962	-	18	5,091	5,044	-	-	47	112,474	100,047	11,425	-	1,002	-	-	-	-	-
Eastern redcedar	-	-	-	-	-	106	106	-	-	-	2,560	1,708	-	852	-	-	-	-	-	-
Northern white-ceda	-	-	-	-	-	49,694	37,080	7,212	4,076	1,326	1,200,993	1,070,769	108,235	21,989	-	-	-	-	-	-
Other softwoods	-	-	-	-	-	-	-	-	-	-	110,789	109,609	1,180	-	-	-	-	-	-	-
Total	301,976	15,296	127,662	81,627	77,391	604,260	240,844	170,624	106,643	86,149	6,170,002	4,790,649	799,170	390,220	189,963	198,567	71,448	45,956	41,205	39,958

Species group	Tree grade 1					Tree grade 2					Tree grade 3					Tie and timber				
		Diameter class (inches at breast height)					Diameter class (inches at breast height)					Diameter class (inches at breast height)					Diameter class (inches at breast height)			
	Total	11.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	11.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	11.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	11.0-14.9	15.0-18.9	19.0-20.9	21.0+
Hardwoods																				
Select white oak	75,402	-	31,851	29,931	13,620	257,849	116,936	97,584	24,391	18,938	431,975	269,294	105,900	31,767	25,014	142,263	82,183	40,183	19,897	-
Select red oak	547,704	-	203,967	200,016	143,721	1,162,142	439,916	386,959	239,279	95,988	1,206,011	757,539	265,055	120,041	63,376	374,081	250,585	78,515	25,861	19,120
Other red oak	30,560	-	12,801	14,111	3,648	88,610	19,215	43,226	14,732	11,437	274,393	98,822	88,376	54,572	32,623	185,623	115,308	55,992	11,899	2,424
Select hickory	166	166	-	-	-	481	481	-	-	-	1,490	1,490	-	-	-	1,008	328	-	680	-
Other hickory	170	170	-	-	-	494	494	-	-	-	1,530	950	-	580	-	1,035	930	-	105	-
Basswood	188,250	4,933	141,212	34,955	7,150	509,486	355,710	130,979	14,843	7,954	442,583	380,606	21,458	32,446	8,073	8,584	8,584	-	-	-
Beech	102,442	-	36,745	45,364	20,333	261,551	38,670	105,467	68,425	48,989	251,514	115,567	97,295	25,433	13,219	16,660	12,598	-	4,062	-
Yellow birch	14,741	-	8,770	5,971	-	32,558	16,898	13,039	2,621	-	61,905	53,103	5,315	-	3,487	9,059	-	9,059	-	-
Hard maple	232,304	-	120,353	72,752	39,199	654,060	352,912	260,792	40,356	-	1,116,202	876,780	126,075	53,550	59,797	189,982	127,858	40,562	21,562	-
Soft maple	270,837	-	125,752	51,972	93,113	767,959	341,485	310,892	80,605	34,977	1,348,004	962,472	236,657	120,697	28,178	234,102	131,742	67,027	21,012	14,321
Elm	16,481	-	10,258	1,493	4,730	25,981	24,411	-	1,570	-	4,687	4,403	-	284	-	-	-	-	-	-
Black ash	2,296	2,066	-	157	73	37,540	22,435	12,061	2,075	969	50,390	38,209	7,582	3,135	1,464	4,522	4,069	-	309	144
White & green ash	213,794	7,343	153,253	44,163	9,035	304,583	158,409	115,164	18,437	12,573	297,266	228,383	29,469	26,843	12,571	14,646	1,621	12,447	-	578
Sycamore	1,608	-	702	906	-	2,290	-	1,090	1,200	-	2,235	-	1,091	1,144	-	110	110	-	-	-
Cottonwood	45,504	-	-	15,053	30,451	13,405	1,981	9,856	1,568	-	8,758	6,940	-	1,818	-	2,336	2,336	-	-	-
Willow	3,759	-	3,759	-	-	14,108	2,324	8,125	-	3,659	7,566	4,291	-	-	3,275	5,557	402	693	4,462	-
Hackberry	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Balsam poplar	61,693	-	24,666	34,629	2,398	106,789	44,611	51,802	-	10,376	177,575	155,337	-	-	22,238	47,551	13,747	29,559	-	4,245
Bigtooth aspen	116,555	-	85,931	30,624	-	731,559	466,123	232,820	32,616	-	1,351,424	1,049,445	229,036	46,450	26,493	196,481	140,156	37,104	19,221	-
Quaking aspen	99,611	-	64,208	14,862	20,541	545,815	254,359	237,449	54,007	-	1,005,605	739,945	189,280	57,407	18,973	231,052	180,416	50,636	-	-
Paper birch	5,774	-	5,774	-	-	78,805	47,604	31,201	-	-	263,593	222,459	24,256	16,878	-	31,302	13,608	17,694	-	-
Tupelo	29	29	-	-	-	392	392	-	-	-	1,309	1,309	-	-	-	156	156	-	-	-
Black cherry	56,609	-	39,407	15,325	1,877	75,586	50,235	21,098	-	4,253	153,242	129,066	14,942	-	9,234	17,602	16,503	-	-	1,099
Black walnut	-	-	-	-	-	3,703	675	3,028	-	-	-	-	-	-	-	-	-	-	-	-
Butternut	-	-	-	-	-	-	-	-	-	-	1,706	706	1,000	-	-	-	-	-	-	-
Yellow-poplar	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sassafras	-	-	-	-	-	5,590	3,953	1,637	-	-	4,833	3,418	1,415	-	-	-	-	-	-	-
Other hardwoods	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	2,086,289	14,707	1,069,409	612,284	389,889	5,681,336	2,760,229	2,074,269	596,725	250,113	8,465,796	6,100,534	1,444,202	593,045	328,015	1,713,712	1,103,240	439,471	129,070	41,931
All species	2,388,265	30,003	1,197,071	693,911	467,280	6,285,596	3,001,073	2,244,893	703,368	336,262	14,635,798	10,891,183	2,243,372	983,265	517,978	1,912,279	1,174,688	485,427	170,275	81,889

(Table 15 continued on next page)

(Table 15 continued)

Southern Lower Peninsula

Species group	Log grade 1					Log grade 2					Log grade 3					Log grade 4				
		Diameter class (inches at breast height)					Diameter class (inches at breast height)					Diameter class (inches at breast height)					Diameter class (inches at breast height)			
	Total	9.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	9.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	9.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	9.0-14.9	15.0-18.9	19.0-20.9	21.0+
Softwoods																				
Jack pine	-	-	-	-	-	-	-	-	-	-	33,556	33,556	-	-	-	-	-	-	-	-
Red pine	-	-	-	-	-	-	-	-	-	-	285,654	257,505	28,149	-	-	-	-	-	-	-
White pine	25,364	-	6,477	-	18,887	20,484	20,484	-	-	-	330,785	145,608	58,134	66,792	60,251	60,545	31,805	11,140	17,600	-
White spruce	-	-	-	-	-	-	-	-	-	-	24,342	24,342	-	-	-	-	-	-	-	-
Black spruce	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Balsam fir	-	-	-	-	-	290	290	-	-	-	1,713	1,713	-	-	-	-	-	-	-	-
Hemlock	-	-	-	-	-	5,876	-	2,949	-	2,927	34,675	10,671	2,970	7,039	13,995	-	-	-	-	-
Tamarack	-	-	-	-	-	22,577	20,449	2,128	-	-	13,294	13,294	-	-	-	-	-	-	-	-
Eastern redcedar	-	-	-	-	-	-	-	-	-	-	2,211	2,211	-	-	-	-	-	-	-	-
Northern white-ceda	-	-	-	-	-	-	-	-	-	-	17,308	16,086	1,222	-	-	-	-	-	-	-
Other softwoods	-	-	-	-	-	-	-	-	-	-	96,372	80,610	12,039	3,723	-	-	-	-	-	-
Total	25,364	-	6,477	-	18,887	49,227	41,223	5,077	-	2,927	839,910	585,596	102,514	77,554	74,246	60,545	31,805	11,140	17,600	-

Species group	Tree grade 1					Tree grade 2					Tree grade 3					Tie and timber				
		Diameter class (inches at breast height)					Diameter class (inches at breast height)					Diameter class (inches at breast height)					Diameter class (inches at breast height)			
	Total	11.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	11.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	11.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	11.0-14.9	15.0-18.9	19.0-20.9	21.0+
Hardwoods																				
Select white oak	325,170	-	98,441	89,467	137,262	569,874	91,848	172,751	121,921	183,354	655,556	220,753	180,417	130,118	124,268	196,701	77,505	69,841	24,336	25,019
Select red oak	398,618	-	69,931	151,342	177,345	462,392	114,043	155,262	127,732	65,355	533,336	214,466	156,260	54,649	107,961	354,733	167,979	121,185	53,150	12,419
Other red oak	129,416	-	37,099	62,286	30,031	225,124	49,303	90,583	55,007	30,231	229,675	91,110	90,798	15,742	32,025	156,625	83,794	49,041	13,301	10,489
Select hickory	38,409	-	13,529	24,880	-	77,533	38,724	38,809	-	-	101,769	59,331	28,832	-	13,606	50,552	35,457	15,095	-	-
Other hickory	31,764	-	30,959	-	805	48,636	40,507	6,607	-	1,522	56,219	45,315	9,156	-	1,748	37,181	18,554	5,185	12,430	1,012
Basswood	136,601	-	54,138	62,320	20,143	144,253	89,747	54,506	-	-	115,284	59,512	13,829	10,133	31,810	-	-	-	-	-
Beech	88,249	-	-	-	88,249	100,463	-	28,782	39,794	31,887	101,362	32,796	13,698	18,456	36,412	17,344	2,227	6,823	4,800	3,494
Yellow birch	-	-	-	-	-	3,892	2,673	-	573	646	20,711	14,220	-	3,050	3,441	4,739	-	3,997	349	393
Hard maple	303,208	-	149,943	96,129	57,136	177,106	79,665	36,083	46,049	15,309	171,030	71,342	49,379	24,552	25,757	48,389	31,182	9,335	-	7,872
Soft maple	767,385	-	321,157	212,952	233,276	583,327	155,307	185,071	107,358	135,591	677,993	270,280	178,309	100,326	129,078	235,484	117,518	49,207	38,364	30,395
Elm	11,799	-	11,176	623	-	49,029	29,445	17,467	2,117	-	163,200	121,550	31,442	6,725	3,483	24,066	18,198	4,890	978	-
Black ash	-	-	-	-	-	51,290	26,589	19,919	1,895	2,887	63,359	45,425	11,767	2,445	3,722	3,870	3,459	-	163	248
White & green ash	307,010	-	149,123	110,865	47,022	417,129	168,304	142,095	35,550	71,180	356,020	280,525	52,164	14,486	8,845	84,227	41,727	18,949	-	23,551
Sycamore	26,488	-	1,913	3,291	21,284	36,332	7,677	28,655	-	-	32,590	20,737	-	11,853	-	6,035	4,125	1,910	-	-
Cottonwood	93,142	-	25,818	14,066	53,258	101,562	13,848	45,718	41,996	-	201,283	48,737	42,225	21,358	88,963	51,729	28,368	19,868	3,493	-
Willow	5,020	-	-	-	5,020	45,854	2,749	12,661	7,651	22,793	48,051	25,615	10,525	11,911	-	25,514	8,318	12,340	4,856	-
Hackberry	1,198	-	1,198	-	-	2,176	989	612	575	-	2,960	2,960	-	-	-	1,210	560	650	-	-
Balsam poplar	6,734	-	1,393	1,918	3,423	3,970	1,981	838	1,151	-	15,105	7,537	3,184	4,384	-	3,655	1,824	770	1,061	-
Bigtooth aspen	-	-	-	-	-	45,743	32,992	11,631	591	529	127,472	93,730	30,590	1,663	1,489	103,426	85,453	15,259	1,432	1,282
Quaking aspen	13,499	-	9,099	4,400	-	11,173	8,096	3,077	-	-	64,121	41,439	20,423	-	2,259	39,581	28,680	10,901	-	-
Paper birch	-	-	-	-	-	-	-	-	-	-	24,655	18,176	4,626	1,853	-	-	-	-	-	-
Tupelo	-	-	-	-	-	-	-	-	-	-	9,385	4,422	-	2,435	2,528	-	-	-	-	-
Black cherry	76,641	-	46,650	27,752	2,239	167,670	89,449	48,093	24,898	5,230	283,032	186,390	69,538	18,037	9,067	26,714	18,098	-	7,828	788
Black walnut	31,645	-	22,056	9,589	-	71,144	42,234	20,310	6,004	2,596	49,118	28,446	8,770	6,598	5,304	5,384	5,384	-	-	-
Butternut	-	-	-	-	-	19,167	12,120	5,614	1,433	-	3,823	3,577	-	246	-	-	-	-	-	-
Yellow-poplar	27,454	-	6,205	9,059	12,190	86,263	32,081	28,355	25,827	-	44,381	14,667	13,026	12,161	4,527	4,637	2,018	525	2,094	-
Sassafras	8,289	-	8,242	-	47	11,602	4,296	7,245	-	61	39,428	37,712	-	-	1,716	-	-	-	-	-
Other hardwoods	4,502	-	4,401	-	101	7,426	6,838	-	223	365	24,643	13,810	8,787	780	1,266	1,936	964	810	61	101
Total	2,832,241	-	1,062,471	880,939	888,831	3,520,130	1,141,505	1,160,744	648,345	569,536	4,215,561	2,074,580	1,027,745	473,961	639,275	1,483,732	781,392	416,581	168,696	117,063
All species	2,857,605	-	1,068,948	880,939	907,718	3,569,357	1,182,728	1,165,821	648,345	572,463	5,055,471	2,660,176	1,130,259	551,515	713,521	1,544,277	813,197	427,721	186,296	117,063

(Table 15 continued on next page)

(Table 15 continued)

All Units

Species group	Log grade 1					Log grade 2					Log grade 3					Log grade 4				
		Diameter class (inches at breast height)					Diameter class (inches at breast height)					Diameter class (inches at breast height)					Diameter class (inches at breast height)			
	Total	9.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	9.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	9.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	9.0-14.9	15.0-18.9	19.0-20.9	21.0+
Softwoods																				
Jack pine	3,103	3,103	-	-	-	8,429	8,341	53	35	-	1,463,068	1,368,656	90,569	3,843	-	-	-	-	-	-
Red pine	260,262	49,477	133,149	69,991	7,645	235,884	85,761	117,782	23,382	8,959	4,295,792	3,376,186	571,037	282,239	66,330	-	-	-	-	-
White pine	539,065	11,812	138,313	140,490	248,450	887,039	263,801	212,882	188,598	221,758	2,002,610	758,446	437,048	433,474	373,642	544,725	222,372	110,426	103,729	108,198
White spruce	11,639	-	11,204	182	253	62,863	34,812	10,300	2,397	15,354	1,875,634	1,260,162	468,753	128,885	17,834	-	-	-	-	-
Black spruce	-	-	-	-	-	4,670	4,670	-	-	-	504,231	453,396	43,002	7,833	-	-	-	-	-	-
Balsam fir	-	-	-	-	-	10,804	10,804	-	-	-	1,470,224	1,386,850	74,884	5,097	3,393	-	-	-	-	-
Hemlock	86,568	-	35,024	30,535	21,009	325,574	47,012	124,147	100,081	54,334	2,741,870	1,105,195	829,798	459,174	347,703	-	-	-	-	-
Tamarack	2,980	-	2,962	-	18	54,289	37,470	13,395	3,266	158	373,413	333,157	34,725	3,503	2,028	-	-	-	-	-
Eastern redcedar	-	-	-	-	-	106	106	-	-	-	4,771	3,919	-	852	-	-	-	-	-	-
Northern white-ceda	7,606	-	2,369	5,237	-	109,850	75,956	28,492	4,076	1,326	4,579,440	3,745,580	629,934	170,967	32,959	-	-	-	-	-
Other softwoods	-	-	-	-	-	-	-	-	-	-	226,052	208,000	14,329	3,723	-	-	-	-	-	-
Total	911,223	64,392	323,021	246,435	277,375	1,699,508	568,733	507,051	321,835	301,889	19,537,105	13,999,547	3,194,079	1,499,590	843,889	544,725	222,372	110,426	103,729	108,198

Species group	Tree grade 1					Tree grade 2					Tree grade 3					Tie and timber				
		Diameter class (inches at breast height)					Diameter class (inches at breast height)					Diameter class (inches at breast height)					Diameter class (inches at breast height)			
	Total	11.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	11.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	11.0-14.9	15.0-18.9	19.0-20.9	21.0+	Total	11.0-14.9	15.0-18.9	19.0-20.9	21.0+
Hardwoods																				
Select white oak	400,572	-	130,292	119,398	150,882	827,723	208,784	270,335	146,312	202,292	1,092,624	493,829	286,860	162,653	149,282	338,964	159,688	110,024	44,233	25,019
Select red oak	1,037,463	-	295,950	393,723	347,790	1,775,668	600,905	614,518	396,485	163,760	1,912,247	1,092,895	456,489	185,980	176,883	788,054	451,639	225,865	79,011	31,539
Other red oak	159,976	-	49,900	76,397	33,679	313,734	68,518	133,809	69,739	41,668	504,068	189,932	179,174	70,314	64,648	342,248	199,102	105,033	25,200	12,913
Select hickory	38,575	166	13,529	24,880	-	78,014	39,205	38,809	-	-	103,259	60,821	28,832	-	13,606	51,560	35,785	15,095	680	-
Other hickory	31,934	170	30,959	-	805	49,130	41,001	6,607	-	1,522	58,887	46,606	9,156	580	2,545	38,216	19,484	5,185	12,535	1,012
Basswood	511,627	12,882	313,130	140,315	45,300	945,297	621,637	280,603	29,113	13,944	1,014,004	837,772	70,676	63,774	41,782	33,597	30,012	3,585	-	-
Beech	251,504	-	68,046	63,899	119,559	605,356	135,711	226,417	145,572	97,656	616,948	258,755	223,147	85,415	49,631	203,143	88,294	69,301	35,506	10,042
Yellow birch	225,124	-	121,721	70,126	33,277	410,314	162,519	163,770	67,938	16,087	755,250	396,167	189,836	93,398	75,849	82,483	35,962	34,259	4,324	7,938
Hard maple	1,347,919	-	670,356	430,337	247,226	2,855,979	1,105,361	1,169,411	456,446	124,761	4,315,769	2,966,969	814,351	359,779	174,670	763,253	474,853	173,568	78,882	35,950
Soft maple	1,203,363	-	549,221	309,067	345,075	2,059,744	827,950	801,898	250,047	179,849	3,633,907	2,286,426	785,830	379,531	182,120	811,524	465,091	178,201	85,084	83,148
Elm	143,774	47,458	61,409	16,512	18,395	81,802	53,856	22,981	4,824	141	181,826	134,692	31,442	11,638	4,054	24,066	18,198	4,890	978	-
Black ash	21,934	2,066	15,692	2,451	1,725	178,554	106,138	54,334	14,226	3,856	257,286	213,418	33,102	5,580	5,186	17,443	11,444	5,135	472	392
White & green ash	596,195	7,343	347,612	180,411	60,829	792,606	376,829	278,037	53,987	83,753	723,899	571,407	89,747	41,329	21,416	101,957	46,432	31,396	-	24,129
Sycamore	28,096	-	2,615	4,197	21,284	38,622	7,677	29,745	1,200	-	34,825	20,737	1,091	12,997	-	6,145	4,235	1,910	-	-
Cottonwood	138,646	-	25,818	29,119	83,709	114,967	15,829	55,574	43,564	-	210,041	55,677	42,225	23,176	88,963	56,507	31,066	21,948	3,493	-
Willow	9,264	485	3,759	-	5,020	60,749	5,324	21,322	7,651	26,452	56,201	30,034	10,981	11,911	3,275	31,556	8,720	13,518	9,318	-
Hackberry	1,198	-	1,198	-	-	2,176	989	612	575	-	2,960	2,960	-	-	-	1,210	560	650	-	-
Balsam poplar	147,250	-	69,537	56,839	20,874	283,890	116,980	122,003	27,614	17,293	416,964	321,979	44,604	25,857	24,524	129,389	73,234	43,305	8,605	4,245
Bigtooth aspen	220,756	-	164,942	55,425	389	954,817	580,254	319,382	54,301	880	1,779,309	1,375,825	295,608	66,943	40,933	338,883	249,585	67,131	20,653	1,514
Quaking aspen	253,178	-	177,909	41,092	34,177	1,146,479	545,922	494,569	101,753	4,235	2,751,194	1,930,598	625,093	156,059	39,444	585,707	472,279	110,606	-	2,822
Paper birch	31,352	-	21,629	9,459	264	300,291	179,194	110,943	7,605	2,549	778,225	673,825	79,825	18,731	5,844	99,322	67,959	30,749	-	614
Tupelo	29	29	-	-	-	392	392	-	-	-	10,694	5,731	-	2,435	2,528	156	156	-	-	-
Black cherry	138,969	-	91,655	43,181	4,133	339,794	204,766	93,773	30,844	10,411	548,893	410,506	99,096	20,577	18,714	59,431	39,445	9,972	8,085	1,929
Black walnut	31,645	-	22,056	9,589	-	74,847	42,909	23,338	6,004	2,596	49,118	28,446	8,770	6,598	5,304	5,384	5,384	-	-	-
Butternut	-	-	-	-	-	19,844	12,120	6,291	1,433	-	7,395	5,487	1,662	246	-	-	-	-	-	-
Yellow-poplar	27,454	-	6,205	9,059	12,190	86,263	32,081	28,355	25,827	-	44,381	14,667	13,026	12,161	4,527	4,637	2,018	525	2,094	-
Sassafras	8,289	-	8,242	-	47	17,192	8,249	8,882	-	61	44,261	41,130	1,415	-	1,716	-	-	-	-	-
Other hardwoods	4,502	-	4,401	-	101	7,571	6,983	-	223	365	25,044	14,211	8,787	780	1,266	1,936	964	810	61	101
Total	7,010,588	70,599	3,267,783	2,085,476	1,586,730	14,421,815	6,108,083	5,376,318	1,943,283	994,131	21,929,479	14,481,502	4,430,825	1,818,442	1,198,710	4,916,771	2,991,589	1,262,661	419,214	243,307
All species	7,921,811	134,991	3,590,804	2,331,911	1,864,105	16,121,323	6,676,816	5,883,369	2,265,118	1,296,020	41,466,584	28,481,049	7,624,904	3,318,032	2,042,599	5,461,496	3,213,961	1,373,087	522,943	351,505

[1] International 1/40inch rule.

Table 16. -- Net volume of growing stock and sawtimber on timberland by Forest Survey Unit, county, and major species group, Michigan, 1993

Forest Survey Unit and county	Growing stock					Sawtimber				
		Major species group					Major species group			
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	(In thousand cubic feet)					(In thousand board feet) [1]				
Eastern Upper Peninsula										
Alger	777,861	106,117	175,612	205,299	290,833	2,345,044	489,646	609,315	439,866	806,217
Chippewa	922,711	147,032	280,529	344,852	150,298	2,308,928	469,880	684,915	786,966	367,167
Delta	757,000	88,993	258,431	285,629	123,947	1,707,669	287,591	567,439	541,152	311,487
Luce	644,572	116,655	185,141	177,821	164,955	1,946,852	458,659	565,027	411,700	511,466
Mackinac	709,893	76,119	252,370	252,420	128,984	1,742,564	331,437	615,298	481,897	313,932
Menominee	647,139	34,015	240,771	228,782	143,571	1,308,806	140,463	477,790	388,861	301,692
Schoolcraft	644,812	120,699	193,382	201,590	129,141	1,739,594	464,103	478,241	422,711	374,539
Total	5,103,988	689,630	1,586,236	1,696,393	1,131,729	13,099,457	2,641,779	3,998,025	3,473,153	2,986,500
Western Upper Peninsula										
Baraga	843,163	25,937	210,326	250,288	356,612	2,579,752	117,222	779,882	637,683	1,044,965
Dickinson	584,033	32,995	170,765	252,266	128,007	1,346,871	142,933	403,266	594,774	205,898
Gogebic	948,485	36,313	249,353	293,108	369,711	2,460,645	136,997	885,805	636,386	801,457
Houghton	904,393	56,574	168,574	302,426	376,819	2,558,956	229,250	647,751	702,168	979,787
Iron	912,694	56,781	205,869	323,197	326,847	2,427,592	252,405	626,444	747,762	800,981
Keweenaw	331,297	20,899	106,283	96,870	107,245	958,909	99,911	341,495	221,508	295,995
Marquette	1,571,937	187,389	437,549	520,824	426,175	4,348,659	810,762	1,338,643	1,076,708	1,122,546
Ontonagon	1,088,163	47,752	212,780	445,838	381,793	2,941,725	188,252	801,888	1,034,969	916,616
Total	7,184,165	464,640	1,761,499	2,484,817	2,473,209	19,623,109	1,977,732	5,825,174	5,651,958	6,168,245
Northern Lower Peninsula										
Alcona	489,698	59,631	59,388	216,855	153,824	1,276,067	175,619	142,225	527,916	430,307
Alpena	308,377	32,395	86,524	155,077	34,381	747,372	131,415	179,072	347,224	89,661
Antrim	333,367	18,831	27,500	158,855	128,181	743,042	46,614	89,229	355,776	251,423
Arenac	145,505	12,838	5,236	96,214	31,217	364,939	44,301	10,940	215,052	94,646
Bay	56,318	-	-	46,683	9,635	130,943	-	-	98,551	32,392
Benzie	225,371	42,803	13,158	76,065	93,345	563,958	73,967	34,406	207,102	248,483
Charlevoix	373,313	33,571	73,446	122,610	143,686	1,025,708	138,400	188,316	336,287	362,705
Cheboygan	437,126	66,354	66,205	190,445	114,122	1,028,314	216,281	164,779	447,880	199,374
Clare	328,363	54,546	14,033	165,869	93,915	818,238	149,140	31,626	327,092	310,380
Crawford	305,347	103,661	16,343	74,003	111,340	717,265	329,082	30,555	115,870	241,758
Emmet	369,457	19,984	35,514	144,519	169,440	893,012	77,759	80,956	370,216	364,081
Gladwin	212,002	18,463	3,669	157,635	32,235	498,114	60,462	7,451	341,742	88,459
Grand Traverse	271,775	93,864	24,997	85,924	66,990	603,683	131,380	63,450	212,887	195,966
Iosco	313,397	91,258	45,304	129,187	47,648	801,111	256,874	110,922	321,952	111,363
Isabella	141,812	6,209	6,291	84,282	45,030	401,141	8,850	14,284	212,105	165,902
Kalkaska	375,036	117,683	27,663	114,165	115,525	797,283	241,100	74,723	246,036	235,424
Lake	441,897	123,828	17,381	104,441	196,247	1,250,368	369,629	35,086	233,427	612,226
Leelanau	175,649	24,605	11,282	34,261	105,501	500,634	57,235	30,981	89,816	322,602
Manistee	368,393	73,384	14,208	131,178	149,623	963,333	144,587	39,771	341,116	437,859
Mason	235,118	51,614	3,158	93,139	87,207	602,150	84,716	9,488	227,985	279,961
Mecosta	211,754	23,458	15,861	121,864	50,571	533,837	84,068	38,610	267,522	143,637
Midland	229,882	13,175	4,068	158,814	53,825	601,748	58,691	11,470	376,609	154,978
Missaukee	296,677	51,617	40,260	137,513	67,287	703,572	150,421	96,589	268,108	188,454
Montmorency	341,804	63,149	37,738	137,348	103,569	825,677	233,152	69,434	260,461	262,630
Newaygo	540,658	103,935	15,055	185,833	235,835	1,595,786	282,791	50,189	512,132	750,674
Oceana	242,483	44,143	12,468	97,797	88,075	635,282	110,186	36,792	213,814	274,490
Ogemaw	287,607	41,682	25,304	146,543	74,078	630,710	90,276	46,565	332,816	161,053
Osceola	228,470	19,015	31,191	105,284	72,980	627,896	45,643	103,585	253,561	225,107
Oscoda	312,463	103,203	16,583	99,300	93,377	863,005	343,613	33,112	208,316	277,964
Otsego	379,135	53,606	32,616	136,147	156,766	803,661	140,808	74,955	293,463	294,435
Presque Isle	376,369	52,351	111,121	155,461	57,436	855,698	199,149	245,737	298,774	112,038
Roscommon	353,659	58,334	56,638	124,193	114,494	922,614	222,194	97,927	263,740	338,753
Wexford	413,444	142,443	27,500	110,204	133,297	895,777	283,529	49,648	251,405	311,195
Total	10,121,726	1,815,633	977,703	4,097,708	3,230,682	25,221,938	4,981,932	2,292,873	9,376,753	8,570,380

(Table 16 continued on next page)

(Table 16 continued)

Forest Survey Unit and county	Growing stock					Sawtimber				
	All species	Major species group				All species	Major species group			
		Pine	Other softwoods	Soft hardwoods	Hard hardwoods		Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	(In thousand cubic feet)					(In thousand board feet) [1]				
Southern Lower Peninsula										
Allegan	288,664	24,446	927	99,042	163,792	915,568	80,687	4,012	298,248	532,621
Barry	188,908	8,255	3,477	68,076	109,100	615,876	28,180	9,239	179,094	399,363
Berrien	140,413	3,784	544	75,391	60,694	480,145	8,510	3,035	248,863	219,737
Branch	88,461	211	174	57,418	30,658	281,880	-	932	183,744	97,204
Calhoun	166,146	2,410	-	93,764	69,972	506,899	10,850	-	217,753	278,296
Cass	133,519	945	406	64,078	68,090	447,233	3,077	2,064	202,384	239,708
Clinton	58,400	-	-	40,966	17,434	141,197	-	-	104,660	36,537
Eaton	116,019	975	-	59,975	55,069	306,002	2,585	-	158,091	145,326
Genesee	74,295	-	-	29,745	44,550	235,007	-	-	79,746	155,261
Gratiot	71,764	3,064	-	34,662	34,038	211,308	8,471	-	98,445	104,392
Hillsdale	81,904	8,382	170	26,760	46,592	249,331	26,321	-	64,468	158,542
Huron	77,426	-	866	59,341	17,219	212,598	-	-	161,239	51,359
Ingham	79,607	513	855	39,340	38,899	245,674	2,407	4,455	117,640	121,172
Ionia	91,406	1,660	3,536	40,766	45,444	253,950	5,036	2,732	82,920	163,262
Jackson	122,578	2,275	165	36,967	83,171	401,393	5,563	-	94,366	301,464
Kalamazoo	115,629	19,144	1,271	58,836	36,378	360,820	73,469	3,234	184,457	99,660
Kent	211,556	13,079	250	86,884	111,343	639,037	58,874	-	217,632	362,531
Lapeer	120,494	16,253	3,544	50,895	49,802	341,043	33,617	14,375	127,632	165,419
Lenawee	94,475	-	1,515	42,076	50,884	274,333	-	1,787	102,078	170,468
Livingston	139,327	11,968	-	47,905	79,454	484,771	46,317	-	134,005	304,449
Macomb	52,108	-	2,763	27,568	21,777	155,569	-	6,210	70,925	78,434
Monroe	66,164	-	-	20,533	45,631	210,369	-	-	73,214	137,155
Montcalm	186,282	24,505	5,522	75,612	80,078	546,684	93,965	16,783	188,700	247,236
Muskegon	227,741	42,569	3,682	68,731	111,370	724,717	170,644	18,045	206,092	329,936
Oakland	127,158	1,514	293	48,586	76,765	383,490	7,083	-	101,011	275,396
Ottawa	112,721	18,815	1,781	42,189	49,170	361,539	58,271	7,731	113,269	182,268
Saginaw	114,969	7,045	-	50,639	57,285	315,243	27,096	-	99,972	188,175
St. Clair	160,466	10,226	1,185	58,376	90,316	497,791	54,596	5,015	170,531	267,649
St. Joseph	103,800	1,051	3,609	43,628	55,512	331,433	4,319	4,733	116,889	205,492
Sanilac	69,122	1,081	804	47,569	19,668	146,959	2,522	2,412	89,018	53,007
Shiawassee	92,292	-	-	42,391	49,901	326,005	-	-	140,275	185,730
Tuscola	127,122	1,761	4,189	84,124	36,869	314,352	6,982	9,016	188,519	109,835
Van Buren	163,593	7,754	-	71,490	84,349	497,213	32,818	-	172,410	291,985
Washtenaw	122,168	-	1,516	30,378	90,274	442,787	-	6,976	74,511	361,300
Wayne	52,028	-	-	22,856	29,172	168,494	-	-	53,584	114,910
Total	4,235,006	233,685	43,044	1,847,557	2,110,720	13,026,710	852,260	122,786	4,916,385	7,135,279
All counties	26,644,885	3,203,588	4,368,482	10,126,475	8,946,340	70,971,214	10,453,703	12,238,858	23,418,249	24,860,404

[1] International 1/4-inch rule.

Table 17. -- Net volume of all live trees and salvable dead trees on timberland by class of timber and major species group, Michigan, 1993

(In thousand cubic feet)

Class of timber	All species	Major species group			
		Pine	Other softwoods	Soft hardwoods	Hard hardwoods
Live trees					
Growing stock trees					
Sawtimber					
Saw-log portion	11,499,314	1,772,858	2,056,917	3,728,309	3,941,230
Upper stem portion	3,491,995	244,129	316,076	1,463,992	1,467,798
Total	14,991,309	2,016,987	2,372,993	5,192,301	5,409,028
Poletimber	11,653,576	1,186,601	1,995,489	4,934,174	3,537,312
All growing-stock trees	26,644,885	3,203,588	4,368,482	10,126,475	8,946,340
Cull trees					
Short-log trees	581,364	27,538	72,235	217,672	263,919
Rough trees [1]					
Sawtimber size	754,569	58,595	105,959	282,878	307,137
Poletimber size	841,416	43,997	92,132	352,049	353,238
Total	1,595,985	102,592	198,091	634,927	660,375
Rotten trees [1]					
Sawtimber size	355,541	4,259	75,108	156,091	120,083
Poletimber size	105,309	951	19,704	57,230	27,424
Total	460,850	5,210	94,812	213,321	147,507
All cull trees	2,638,199	135,340	365,138	1,065,920	1,071,801
Salvable dead trees					
Sawtimber size	144,043	12,221	41,016	62,635	28,171
Poletimber size	99,515	7,008	20,360	57,629	14,518
All salvable dead trees	243,558	19,229	61,376	120,264	42,689
All classes	30,108,006	3,385,695	4,867,231	11,530,331	10,060,830

[1]Includes all noncommercial species.

Table 18. -- Net volume of all live trees and growing-stock trees on timberland by ownership class and major species group, Michigan, 1993

(In thousand cubic feet)

	All live trees					Growing-stock trees				
		Major species group					Major species group			
Ownership class	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
National forest	3,903,696	892,661	660,047	1,179,611	1,171,377	3,527,999	871,557	607,989	1,029,115	1,019,338
Other federal	80,575	18,034	12,341	29,769	20,431	74,392	17,538	11,549	27,267	18,038
State	5,341,522	960,778	1,049,628	1,968,045	1,363,071	4,907,405	921,827	970,087	1,784,898	1,230,593
County and municipal	418,327	69,197	46,564	142,603	159,963	379,496	66,758	42,220	128,456	142,062
Indian	27,958	-	4,462	11,642	11,854	26,492	-	4,417	11,022	11,053
Forest industry	2,610,652	74,070	754,252	729,072	1,053,258	2,335,644	72,208	691,597	647,633	924,206
Individual	13,483,957	1,046,601	1,590,663	5,857,081	4,989,612	12,293,004	987,558	1,472,278	5,340,814	4,492,354
Corporate	3,416,397	277,587	615,663	1,274,572	1,248,575	3,100,450	266,142	568,345	1,157,270	1,108,696
All ownerships	29,283,084	3,338,928	4,733,620	11,192,395	10,018,141	26,644,885	3,203,588	4,368,482	10,126,475	8,946,340

Table 19. -- Net volume of growing stock on timberland by forest type group/local type and major species group, Michigan, 1993

(In thousand cubic feet)

Forest type group/ local type	All species	Major species group			
		Pine	Other softwoods	Soft hardwoods	Hard hardwoods
Softwood type groups					
White-red-jack pine					
Jack pine	730,408	623,723	18,041	42,701	45,943
Red pine	1,612,009	1,426,478	25,610	85,803	74,118
White pine	398,749	280,006	35,312	53,264	30,167
Total	2,741,166	2,330,207	78,963	181,768	150,228
Spruce-fir					
Balsam fir	625,706	47,342	375,049	183,543	19,772
White spruce	164,440	14,875	100,129	46,271	3,165
Black spruce	325,813	46,252	243,038	35,970	553
Northern white-cedar	2,029,869	65,894	1,610,870	315,756	37,349
Tamarack	97,986	3,349	86,410	7,688	539
Total	3,243,814	177,712	2,415,496	589,228	61,378
All softwood types	5,984,980	2,507,919	2,494,459	770,996	211,606
Hardwood type groups					
Oak-hickory					
Oak-hickory	2,949,259	162,534	12,650	588,994	2,185,081
Elm-ash-cottonwood					
Elm-ash-soft maple	2,046,580	32,702	240,246	1,422,208	351,424
Maple-beech-birch					
Maple-beech-birch	11,805,898	327,567	135,495	4,452,403	5,890,433
Aspen-birch					
Aspen	3,165,070	146,286	334,189	2,412,676	271,919
Paper birch	479,231	24,225	94,496	327,802	32,708
Balsam poplar	212,663	1,303	56,902	151,289	3,169
Total	3,856,964	171,814	485,587	2,891,767	307,796
All hardwood types	20,658,701	694,617	1,873,978	9,355,372	8,734,734
Nonstocked	1,204	1,052	45	107	-
All forest types	26,644,885	3,203,588	4,368,482	10,126,475	8,946,340

Table 20. -- Average net annual growth of growing stock and sawtimber on timberland by Forest Survey Unit, county, and major species group, Michigan, 1980-1992

Forest Survey Unit and county	Growing stock					Sawtimber				
		Major species group					Major species group			
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	(In thousand cubic feet)					*(In thousand board feet)* [1]				
Eastern Upper Peninsula										
Alger	19,075	3,522	3,849	4,266	7,438	74,644	18,766	17,227	13,238	25,413
Chippewa	23,302	5,420	6,081	7,488	4,313	84,349	20,776	22,055	28,896	12,622
Delta	21,143	3,479	8,019	6,734	2,911	68,816	13,087	24,563	20,170	10,996
Luce	14,122	3,842	2,385	3,936	3,959	58,552	18,110	10,975	14,328	15,139
Mackinac	17,046	2,855	5,116	5,293	3,782	65,205	14,175	21,672	18,144	11,214
Menominee	19,560	1,623	7,374	6,394	4,169	53,636	7,120	18,908	15,124	12,484
Schoolcraft	17,600	4,638	5,034	4,802	3,126	60,834	19,879	15,191	15,220	10,544
Total	131,848	25,379	37,858	38,913	29,698	466,036	111,913	130,591	125,120	98,412
Western Upper Peninsula										
Baraga	16,583	896	3,541	4,390	7,756	65,259	4,220	16,224	18,367	26,448
Dickinson	15,053	1,364	3,715	6,184	3,790	55,520	6,798	15,700	23,050	9,972
Gogebic	22,246	1,633	4,368	6,637	9,608	79,429	6,561	24,240	24,595	24,033
Houghton	21,061	1,616	3,637	6,624	9,184	80,839	8,949	18,569	24,336	28,985
Iron	21,850	2,073	4,223	6,847	8,707	86,179	8,703	19,824	30,773	26,879
Keweenaw	5,746	640	1,379	1,617	2,110	23,321	3,438	6,294	5,706	7,883
Marquette	37,826	5,630	8,921	13,582	9,693	136,146	26,447	34,723	43,684	31,292
Ontonagon	25,832	1,678	4,638	10,144	9,372	95,231	7,119	24,019	39,301	24,792
Total	166,197	15,530	34,422	56,025	60,220	621,924	72,235	159,593	209,812	180,284

(Table 20 continued on next page)

(Table 20 continued)

Forest Survey Unit and county	Growing stock					Sawtimber				
		Major species group					Major species group			
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	(In thousand cubic feet)					*(In thousand board feet)* [1]				
Northern Lower Peninsula										
Alcona	13,059	2,887	1,091	5,070	4,011	53,502	9,024	3,962	21,857	18,659
Alpena	8,793	1,037	2,631	4,020	1,105	27,192	3,953	6,253	13,108	3,878
Antrim	10,413	963	748	4,389	4,313	31,438	2,868	3,106	14,892	10,572
Arenac	4,684	352	237	3,122	973	18,850	2,233	704	11,338	4,575
Bay	2,021	-	-	1,569	452	9,215	-	-	7,524	1,691
Benzie	7,783	2,332	371	2,332	2,748	24,978	5,966	818	8,461	9,733
Charlevoix	8,870	817	2,051	2,172	3,830	33,631	4,375	5,891	10,819	12,546
Cheboygan	13,593	2,892	1,706	5,099	3,896	41,475	9,499	5,398	16,828	9,750
Clare	10,111	2,019	85	5,830	2,177	35,154	7,513	788	16,157	10,696
Crawford	8,700	2,936	357	2,252	3,155	32,323	13,963	1,432	5,628	11,300
Emmet	10,718	1,320	598	3,631	5,169	38,291	6,566	1,726	14,055	15,944
Gladwin	7,362	943	82	5,234	1,103	24,275	2,602	375	16,899	4,399
Grand Traverse	8,823	4,699	543	1,512	2,069	22,809	7,266	2,312	5,540	7,691
Iosco	8,836	3,185	990	3,302	1,359	36,899	14,426	3,173	13,765	5,535
Isabella	4,926	273	150	2,895	1,608	19,919	648	674	11,643	6,954
Kalkaska	12,977	5,590	694	3,172	3,521	34,863	11,767	3,176	10,415	9,505
Lake	13,529	4,932	564	3,032	5,001	52,344	17,764	1,670	11,055	21,855
Leelanau	5,718	1,499	295	1,121	2,803	19,701	4,315	1,014	3,213	11,159
Manistee	11,185	3,418	314	3,549	3,904	37,914	9,834	1,145	12,035	14,900
Mason	8,196	3,038	112	3,110	1,936	30,615	8,721	414	11,573	9,907
Mecosta	8,307	1,286	647	4,497	1,877	23,908	4,669	2,136	12,025	5,078
Midland	7,467	442	107	5,217	1,701	27,728	2,032	646	19,527	5,523
Missaukee	11,808	2,705	1,343	5,453	2,307	30,441	7,099	4,099	12,399	6,844
Montmorency	10,502	2,197	549	4,596	3,160	34,439	8,371	1,747	12,155	12,166
Newaygo	15,606	4,464	205	5,371	5,566	61,067	15,205	1,829	18,918	25,115
Oceana	7,810	1,622	411	3,183	2,594	26,458	6,230	1,515	7,744	10,969
Ogemaw	10,016	2,560	662	4,467	2,327	28,499	3,305	1,686	15,253	8,255
Osceola	7,635	1,263	579	3,746	2,047	24,409	3,787	2,884	9,463	8,275
Oscoda	10,442	4,280	659	2,846	2,657	36,290	14,044	1,293	8,807	12,146
Otsego	11,390	2,348	959	3,270	4,813	33,205	6,438	1,937	10,815	14,015
Presque Isle	9,922	1,576	2,765	3,802	1,779	32,111	7,132	8,078	12,169	4,732
Roscommon	8,091	1,227	1,311	2,879	2,674	35,703	6,364	3,621	11,292	14,426
Wexford	15,053	6,458	1,067	3,606	3,922	41,732	16,391	3,291	9,815	12,235
Total	314,346	77,560	24,883	119,346	92,557	1,061,378	244,370	78,793	397,187	341,028

(Table 20 continued on next page)

(Table 20 continued)

Forest Survey Unit and county	Growing stock					Sawtimber				
		Major species group					Major species group			
	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	(in thousand cubic feet)					*(In thousand board feet)* [1]				
Southern Lower Peninsula										
Allegan	9,057	812	34	3,591	4,620	34,946	4,188	110	12,872	17,776
Barry	5,860	340	245	2,381	2,894	23,728	1,759	791	6,963	14,215
Berrien	4,683	290	12	2,520	1,861	18,462	650	77	9,335	8,400
Branch	2,510	17	1	1,635	857	9,601	-	5	6,755	2,841
Calhoun	5,805	143	-	3,624	2,038	21,138	688	-	12,529	7,921
Cass	3,338	-10	10	1,577	1,761	12,779	251	57	5,715	6,756
Clinton	2,068	-	-	1,433	635	7,152	-	-	6,020	1,132
Eaton	4,794	50	-	2,331	2,413	13,770	218	-	6,413	7,139
Genesee	2,658	-	-	1,259	1,399	9,071	-	-	3,338	5,733
Gratiot	2,511	134	-	1,229	1,148	10,065	359	-	5,097	4,609
Hillsdale	4,401	741	8	1,507	2,145	15,108	3,896	-	3,718	7,494
Huron	3,044	-	55	2,217	772	11,829	-	-	8,737	3,092
Ingham	3,152	52	53	1,690	1,357	11,567	116	374	5,636	5,441
Ionia	3,926	133	367	1,887	1,539	10,728	845	241	3,501	6,141
Jackson	3,737	152	36	1,372	2,177	14,500	434	-	3,852	10,214
Kalamazoo	4,130	606	86	2,078	1,360	12,033	2,633	254	5,934	3,212
Kent	7,561	678	51	2,936	3,896	27,008	3,286	-	8,703	15,019
Lapeer	5,922	971	588	2,716	1,647	18,811	2,449	1,019	8,906	6,437
Lenawee	2,840	-	22	1,505	1,313	9,498	-	22	4,121	5,355
Livingston	4,884	497	-	2,148	2,239	17,880	2,488	-	6,680	8,712
Macomb	1,968	-	92	1,106	770	5,096	-	115	2,776	2,205
Monroe	2,045	-	-	677	1,368	7,041	-	-	2,713	4,328
Montcalm	6,482	974	-15	2,780	2,743	23,282	4,649	513	7,731	10,389
Muskegon	6,874	1,666	102	2,133	2,973	27,224	6,835	880	6,902	12,607
Oakland	4,733	74	73	2,362	2,224	13,673	390	-	4,701	8,582
Ottawa	4,085	684	54	1,786	1,561	14,916	2,473	282	4,589	7,572
Saginaw	3,986	357	-	1,998	1,631	11,662	1,441	-	4,947	5,274
St. Clair	5,060	227	47	1,876	2,910	17,310	1,339	169	6,182	9,620
St. Joseph	3,227	70	254	1,428	1,475	11,785	261	395	4,163	6,966
Sanilac	3,037	138	58	1,971	870	7,495	212	480	3,610	3,193
Shiawassee	3,105	-	-	1,567	1,538	12,746	-	-	5,426	7,320
Tuscola	5,708	145	75	3,670	1,818	14,835	173	497	9,319	4,846
Van Buren	5,505	278	-	2,831	2,396	19,654	1,673	-	7,722	10,259
Washtenaw	3,321	-	53	1,210	2,058	12,832	-	315	3,516	9,001
Wayne	2,007	-	-	1,025	982	6,625	-	-	2,781	3,844
Total	148,024	10,219	2,361	70,056	65,388	515,850	43,706	6,596	211,903	253,645
All counties	760,415	128,688	99,524	284,340	247,863	2,665,188	472,224	375,573	944,022	873,369

[1] International 1/4-inch rule.

Table 21. -- Average annual removals of growing stock and sawtimber on timberland by Forest Survey Unit, county, and major species group, Michigan, 1980-1992

Forest Survey Unit and county	Growing stock					Sawtimber				
	All species	Major species group				All species	Major species group			
		Pine	Other softwoods	Soft hardwoods	Hard hardwoods		Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	(In thousand cubic feet)					(In thousand board feet) [1]				
Eastern Upper Peninsula										
Alger	10,019	1,980	1,741	1,689	4,609	36,516	5,937	6,639	4,159	19,781
Chippewa	8,902	1,050	3,975	2,337	1,540	20,263	2,802	7,697	3,764	6,000
Delta	8,762	1,143	3,134	3,842	643	20,938	1,586	9,836	7,547	1,969
Luce	7,353	330	1,523	1,906	3,594	27,663	1,463	4,726	4,413	17,061
Mackinac	6,551	1,776	1,480	2,213	1,082	13,280	3,940	3,075	2,950	3,315
Menominee	6,863	631	2,280	3,195	757	13,246	2,759	4,877	4,859	751
Schoolcraft	6,512	1,385	1,827	2,494	806	18,079	4,736	4,591	6,602	2,150
Total	54,962	8,295	15,960	17,676	13,031	149,985	23,223	41,441	34,294	51,027
Western Upper Peninsula										
Baraga	11,271	194	2,217	3,707	5,153	44,502	851	10,490	10,427	22,734
Dickinson	4,090	72	821	3,166	31	4,372	200	1,423	2,749	-
Gogebic	6,590	545	285	3,174	2,586	21,618	2,193	1,154	9,822	8,449
Houghton	7,690	429	1,108	2,709	3,444	26,578	1,027	4,188	6,331	15,032
Iron	15,248	1,404	3,573	7,474	2,797	47,918	7,593	10,225	19,678	10,422
Keweenaw	1,661	250	83	744	584	5,049	1,382	143	1,072	2,452
Marquette	23,905	3,717	5,467	9,052	5,669	77,512	16,597	18,332	21,057	21,526
Ontonagon	12,075	86	645	6,691	4,653	36,811	427	2,252	16,236	17,896
Total	82,530	6,697	14,199	36,717	24,917	264,360	30,270	48,207	87,372	98,511
Northern Lower Peninsula										
Alcona	4,124	447	47	1,857	1,773	10,043	1,796	78	4,036	4,133
Alpena	4,654	65	521	3,563	505	9,889	368	1,723	7,118	680
Antrim	2,044	-	-	584	1,460	5,505	-	-	1,304	4,201
Arenac	1,020	21	62	762	175	2,111	-	-	1,700	411
Bay	894	-	-	807	87	2,175	-	-	2,117	58
Benzie	3,081	19	19	1,792	1,251	9,520	-	-	4,814	4,706
Charlevoix	4,314	1,495	906	1,680	233	11,168	4,944	1,164	4,216	844
Cheboygan	2,970	212	230	2,186	342	4,892	854	512	3,045	481
Clare	3,117	308	50	2,661	98	9,145	1,271	-	7,450	424
Crawford	3,501	545	-	1,342	1,614	4,913	1,697	-	1,903	1,313
Emmet	3,997	1,319	108	1,437	1,133	11,135	4,404	500	4,164	2,067
Gladwin	2,932	30	-	2,845	57	7,816	48	-	7,509	259
Grand Traverse	1,034	327	-	359	348	2,153	-	-	466	1,687
Iosco	2,305	674	177	1,113	341	6,312	1,379	497	3,730	706
Isabella	389	-	42	245	102	742	-	226	85	431
Kalkaska	2,616	1,624	106	631	255	8,979	6,390	237	1,366	986
Lake	5,817	1,620	13	1,879	2,305	9,824	2,086	-	3,522	4,216
Leelanau	1,172	192	136	311	533	4,367	1,042	320	942	2,063
Manistee	2,977	1,036	-	595	1,346	7,501	2,807	-	1,308	3,386
Mason	2,320	356	234	1,433	297	4,871	1,239	949	1,656	1,027
Mecosta	917	-	19	767	131	2,212	-	98	1,872	242
Midland	1,475	-	-	1,440	35	1,921	-	-	1,759	162
Missaukee	877	204	-	492	181	2,185	82	-	1,369	734
Montmorency	3,056	1,291	54	1,269	442	6,961	2,494	202	2,790	1,475
Newaygo	6,771	1,060	-	3,251	2,460	18,037	2,727	-	6,326	8,984
Oceana	2,507	308	18	1,140	1,041	8,046	768	94	3,263	3,921
Ogemaw	5,077	901	106	2,487	1,583	11,016	1,466	-	5,733	3,817
Osceola	4,026	240	-	3,605	181	9,077	-	-	8,634	443
Oscoda	4,811	2,850	128	835	998	9,008	4,353	160	1,692	2,803
Otsego	4,643	834	13	1,825	1,971	11,714	2,145	67	2,837	6,665
Presque Isle	4,490	131	2,122	2,179	58	9,705	730	3,714	5,261	-
Roscommon	3,147	1,120	272	1,271	484	8,274	4,196	275	2,690	1,113
Wexford	4,843	1,828	6	2,261	748	8,525	2,664	-	3,992	1,869
Total	101,918	21,057	5,389	50,904	24,568	239,742	51,950	10,816	110,669	66,307

(Table 21 continued on next page)

(Table 21 continued)

Forest Survey Unit and county	Growing stock					Sawtimber				
	All species	Major species group				All species	Major species group			
		Pine	Other softwoods	Soft hardwoods	Hard hardwoods		Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	(In thousand cubic feet)					*(In thousand board feet)* [1]				
Southern Lower Peninsula										
Allegan	2,377	1,482	-	323	572	9,598	6,547	-	1,265	1,786
Barry	2,061	71	-	226	1,764	8,761	393	-	579	7,789
Berrien	258	-	-	258	-	1,318	-	-	1,318	-
Branch	306	-	-	306	-	812	-	-	812	-
Calhoun	537	-	-	478	59	1,912	-	-	1,912	-
Cass	181	-	-	181	-	203	-	-	203	-
Clinton	-	-	-	-	-	-	-	-	-	-
Eaton	1,103	-	-	552	551	3,448	-	-	1,437	2,011
Genesee	410	-	-	141	269	1,575	-	-	513	1,062
Gratiot	1,164	-	-	772	392	5,230	-	-	3,721	1,509
Hillsdale	67	-	-	32	35	181	-	-	-	181
Huron	581	-	-	511	70	1,455	-	-	1,455	-
Ingham	1,161	-	-	650	511	4,474	-	-	2,231	2,243
Ionia	283	-	-	152	131	1,231	-	-	803	428
Jackson	627	-	-	55	572	3,116	-	-	277	2,839
Kalamazoo	238	-	-	-	238	1,107	-	-	-	1,107
Kent	1,520	-	-	235	1,285	5,033	-	-	203	4,830
Lapeer	988	-	-	592	396	2,811	-	-	1,899	912
Lenawee	245	-	-	83	162	1,152	-	-	401	751
Livingston	1,698	-	-	667	1,031	5,553	-	-	2,023	3,530
Macomb	293	-	-	293	-	994	-	-	994	-
Monroe	509	-	-	419	90	2,400	-	-	1,971	429
Montcalm	3,898	74	22	1,880	1,922	12,165	398	-	5,690	6,077
Muskegon	3,680	2,429	-	676	575	12,072	8,368	-	1,505	2,199
Oakland	532	-	-	239	293	1,741	-	-	581	1,160
Ottawa	2,243	430	30	570	1,213	7,620	1,108	79	2,102	4,331
Saginaw	563	-	-	329	234	506	-	-	506	-
St. Clair	476	-	-	50	426	1,953	-	-	214	1,739
St. Joseph	624	-	-	45	579	2,797	-	-	219	2,578
Sanilac	-	-	-	-	-	-	-	-	-	-
Shiawassee	2,120	-	-	575	1,545	9,248	-	-	2,479	6,769
Tuscola	2,063	-	-	1,110	953	5,259	-	-	1,977	3,282
Van Buren	487	-	-	228	259	2,057	-	-	768	1,289
Washtenaw	1,097	-	-	454	643	2,797	-	-	606	2,191
Wayne	516	-	-	142	374	1,855	-	-	541	1,314
Total	34,906	4,486	52	13,224	17,144	122,434	16,814	79	41,205	64,336
All counties	274,316	40,535	35,600	118,521	79,660	776,521	122,257	100,543	273,540	280,181

[1] International 1/4-inch rule.

Table 22. -- Average net annual growth and average annual removals of growing stock and sawtimber on timberland by species group, Michigan, 1980-1992

Species group	Growing stock		Sawtimber	
	Average net annual growth	Average annual removals	Average net annual growth	Average annual removals
	(In thousand cubic feet)		*(In thousand board feet)* [1]	
Softwoods				
Jack pine	12,211	13,276	55,552	28,863
Red pine	78,310	15,980	242,699	43,445
White pine	32,518	10,283	157,432	48,878
White spruce	19,649	6,037	80,833	23,813
Black spruce	3,410	3,566	5,797	5,702
Balsam fir	12,484	9,284	46,338	18,380
Hemlock	12,256	4,426	70,789	21,981
Tamarack	4,481	288	16,116	827
Eastern redcedar	230	-	409	-
Northern white-cedar	46,202	11,999	154,262	29,840
Other softwoods	6,461	996	17,570	1,071
Total softwoods	228,212	76,135	847,797	222,800
Hardwoods				
Select white oak	18,733	6,002	82,414	17,442
Other white oak	25	-	-	-
Select red oak	44,236	17,249	209,222	56,421
Other red oak	10,180	3,806	44,620	13,332
Select hickory	1,965	324	7,286	1,032
Other hickory	1,691	464	6,708	2,058
Basswood	20,084	5,903	88,004	21,742
Beech	13,694	5,660	54,064	23,163
Yellow birch	4,448	5,271	18,897	22,882
Hard maple	113,964	34,553	325,416	127,649
Soft maple	108,225	25,883	313,574	60,633
Elm	7,415	2,614	11,101	5,249
Black ash	8,383	2,252	13,625	3,623
White & green ash	33,068	5,536	110,735	15,328
Sycamore	456	133	2,735	732
Cottonwood	5,224	1,209	24,403	5,459
Willow	773	264	3,906	700
Hackberry	173	-	301	-
Balsam poplar	6,181	3,054	21,811	9,112
Bigtooth aspen	40,817	26,186	162,687	62,897
Quaking aspen	57,148	34,166	207,715	76,560
Paper birch	13,196	13,076	41,988	17,102
Tupelo	293	33	713	78
Black cherry	14,445	3,523	44,469	8,546
Black walnut	1,758	76	6,549	387
Butternut	195	-	954	-
Yellow-poplar	1,332	225	6,036	1,107
Sassafras	2,191	528	4,451	373
Other hardwoods	1,910	191	3,007	114
Total hardwoods	532,203	198,181	1,817,391	553,721
All species	760,415	274,316	2,665,188	776,521

[1]International 1/4-inch rule.

Table 23. -- Average annual mortality of growing stock and sawtimber on timberland by species group, Michigan, 1980-1992

Species group	Growing stock average annual mortality	Sawtimber average annual mortality
	(In thousand cubic feet)	*(In thousand board feet)* [1]
Softwoods		
Jack pine	11,201	23,515
Red pine	577	1,809
White pine	2,229	9,403
White spruce	5,302	20,782
Black spruce	7,841	12,537
Balsam fir	26,038	45,547
Hemlock	2,558	12,073
Tamarack	1,710	3,985
Eastern redcedar	1	8
Northern white-cedar	4,356	13,365
Other softwoods	432	112
Total softwoods	62,245	143,136
Hardwoods		
Select white oak	984	3,166
Select red oak	6,664	13,412
Other red oak	1,879	4,445
Select hickory	444	1,376
Other hickory	290	799
Basswood	4,053	11,289
Beech	856	2,883
Yellow birch	6,860	22,260
Hard maple	8,868	21,450
Soft maple	10,789	23,506
Elm	14,286	28,641
Black ash	3,188	4,549
White & green ash	2,832	5,729
Sycamore	26	44
Cottonwood	350	1,333
Willow	433	1,331
Hackberry	12	6
Balsam poplar	8,258	23,419
Bigtooth aspen	13,711	30,575
Quaking aspen	37,265	74,557
Paper birch	11,119	14,699
River birch	6	30
Tupelo	7	7
Black cherry	2,221	1,834
Black walnut	182	740
Butternut	71	174
Yellow-poplar	63	146
Sassafras	370	409
Other hardwoods	161	41
Total hardwoods	136,248	292,850
All species	198,493	435,986

[1]International 1/4-inch rule.

Table 24. -- Average net annual growth and average annual removals of growing stock and sawtimber on timberland by ownership class and major species group, Michigan, 1980-1992

Ownership class	All species	Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	Average net annual growth of growing stock				
		Major species group			
	(In thousand cubic feet)				
National forest	92,661	34,126	11,738	22,660	24,137
Other federal	2,158	584	364	661	549
State	141,963	34,255	21,045	51,262	35,401
County and municipal	11,259	3,066	833	3,478	3,882
Indian	476	-	100	219	157
Forest industry	52,122	2,538	12,754	14,230	22,600
Individual	379,665	44,959	41,127	161,911	131,668
Corporate	80,111	9,160	11,563	29,919	29,469
All ownerships	760,415	128,688	99,524	284,340	247,863
	Average annual removals of growing stock				
		Major species group			
	(In thousand cubic feet)				
National forest	40,376	11,662	6,909	13,776	8,029
Other federal	1,123	30	602	70	421
State	55,058	13,910	5,949	26,751	8,448
County and municipal	4,090	1,268	75	1,982	765
Indian	-	-	-	-	-
Forest industry	35,464	2,170	8,218	11,475	13,601
Individual	101,068	7,959	10,041	50,160	32,908
Corporate	37,137	3,536	3,806	14,307	15,488
All ownerships	274,316	40,535	35,600	118,521	79,660
	Average net annual growth of sawtimber				
		Major species group			
	(In thousand board feet) [1]				
National forest	350,351	127,726	52,891	82,241	87,493
Other federal	8,146	2,044	1,617	2,417	2,068
State	479,807	132,922	76,167	158,312	112,406
County and municipal	39,930	9,517	3,848	12,635	13,930
Indian	1,605	-	306	601	698
Forest industry	184,360	11,089	54,246	48,708	70,317
Individual	1,303,738	153,992	134,221	534,819	480,706
Corporate	297,251	34,934	52,277	104,289	105,751
All ownerships	2,665,188	472,224	375,573	944,022	873,369
	Average annual removals of sawtimber				
		Major species group			
	(In thousand board feet) [1]				
National forest	86,497	22,247	17,993	24,499	21,758
Other federal	3,991	167	1,958	286	1,580
State	119,293	41,006	14,861	45,980	17,446
County and municipal	10,044	3,095	284	5,101	1,564
Indian	-	-	-	-	-
Forest industry	126,529	10,684	28,430	29,424	57,991
Individual	306,054	30,043	22,883	135,014	118,114
Corporate	124,113	15,015	14,134	33,236	61,728
All ownerships	776,521	122,257	100,543	273,540	280,181

[1]International 1/4-inch rule.

Table 25. -- Average net annual growth and average annual removals of growing stock and sawtimber on timberland by forest type group/local type and major species group, Michigan, 1980-1992

Forest type group/ local type	Average net annual growth of growing stock					Average annual removals of growing stock				
	All species	Major species group				All species	Major species group			
		Pine	Other softwoods	Soft hardwoods	Hard hardwoods		Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	(In thousand cubic feet)					(In thousand cubic feet)				
Softwood type groups										
White-red-jack pine										
Jack pine	22,785	18,777	876	1,919	1,213	6,930	5,841	64	703	322
Red pine	73,594	67,521	1,032	3,057	1,984	23,498	18,250	729	3,012	1,507
White pine	11,962	9,515	332	1,365	750	3,630	2,729	202	457	242
Total	108,341	95,813	2,240	6,341	3,947	34,058	26,820	995	4,172	2,071
Spruce-fir										
Balsam fir	17,032	1,768	10,336	4,479	449	6,177	230	4,566	1,338	43
White spruce	7,565	717	5,352	1,371	125	342	105	35	179	23
Black spruce	9,532	1,529	6,601	1,375	27	2,026	410	969	647	-
Northern white-cedar	32,471	1,721	29,270	1,096	384	7,691	260	6,450	787	194
Tamarack	2,753	75	2,335	323	20	453	23	347	83	-
Total	69,353	5,810	53,894	8,644	1,005	16,689	1,028	12,367	3,034	260
All softwood types	177,694	101,623	56,134	14,985	4,952	50,747	27,848	13,362	7,206	2,331
Hardwood type groups										
Oak-hickory										
Oak-hickory	79,079	5,907	723	18,333	54,116	19,426	1,877	14	4,742	12,793
Elm-ash-cottonwood										
Elm-ash-soft maple	61,290	851	5,160	42,184	13,095	12,961	438	1,183	9,954	1,386
Maple-beech-birch										
Maple-beech-birch	315,925	12,855	21,801	117,137	164,132	119,529	5,953	9,147	48,738	55,691
Aspen-birch										
Aspen	109,888	6,478	11,567	81,276	10,567	68,317	3,959	10,785	46,188	7,385
Paper birch	10,922	839	2,572	6,604	907	1,476	-	439	975	62
Balsam poplar	5,467	43	1,521	3,809	94	1,212	-	497	703	12
Total	126,277	7,360	15,660	91,689	11,568	71,005	3,959	11,721	47,866	7,459
All hardwood types	582,571	26,973	43,344	269,343	242,911	222,921	12,227	22,065	111,300	77,329
Nonstocked	150	92	46	12	-	648	460	173	15	-
All forest types	760,415	128,688	99,524	284,340	247,863	274,316	40,535	35,600	118,521	79,660

Forest type group/ local type	Average net annual growth of sawtimber					Average annual removals of sawtimber				
	All species	Major species group				All species	Major species group			
		Pine	Other softwoods	Soft hardwoods	Hard hardwoods		Pine	Other softwoods	Soft hardwoods	Hard hardwoods
	(In thousand board feet) [1]					(In thousand board feet) [1]				
Softwood type groups										
White-red-jack pine										
Jack pine	77,507	68,220	1,201	3,558	4,528	12,604	11,346	59	601	598
Red pine	226,704	206,801	4,917	7,034	7,952	53,044	43,250	2,714	4,322	2,758
White pine	58,295	48,218	2,630	3,512	3,935	14,752	13,104	340	459	849
Total	362,506	323,239	8,748	14,104	16,415	80,400	67,700	3,113	5,382	4,205
Spruce-fir										
Balsam fir	61,461	9,526	39,050	11,967	918	16,240	1,106	12,868	2,215	51
White spruce	18,702	3,469	11,699	3,267	267	863	613	140	61	49
Black spruce	25,662	7,025	16,801	1,870	-34	6,215	1,895	2,913	1,407	-
Northern white-cedar	110,452	9,646	92,229	7,403	1,174	18,108	1,336	14,490	1,433	849
Tamarack	8,539	610	7,455	442	32	902	113	638	151	-
Total	224,816	30,276	167,234	24,949	2,357	42,328	5,063	31,049	5,267	949
All softwood types	587,322	353,515	175,982	39,053	18,772	122,728	72,763	34,162	10,649	5,154
Hardwood type groups										
Oak-hickory										
Oak-hickory	327,425	22,455	1,265	58,149	245,556	53,617	4,159	70	10,499	38,889
Elm-ash-cottonwood										
Elm-ash-soft maple	205,626	5,703	22,492	137,185	40,246	34,649	2,120	2,262	25,845	4,422
Maple-beech-birch										
Maple-beech-birch	1,116,031	59,436	112,661	407,852	536,082	421,173	28,587	36,661	137,542	218,383
Aspen-birch										
Aspen	370,156	26,947	45,923	267,625	29,661	137,760	13,200	25,774	85,656	13,130
Paper birch	37,340	3,286	9,958	21,466	2,630	2,173	-	419	1,599	155
Balsam poplar	20,589	216	7,259	12,692	422	2,904	-	1,106	1,750	48
Total	428,085	30,449	63,140	301,783	32,713	142,837	13,200	27,299	89,005	13,333
All hardwood types	2,077,167	118,043	199,558	904,969	854,597	652,276	48,066	66,292	262,891	275,027
Nonstocked	699	666	33	-	-	1,517	1,428	89	-	-
All forest types	2,665,188	472,224	375,573	944,022	873,369	776,521	122,257	100,543	273,540	280,181

[1]International 1/4-inch rule.

Table 26. -- All live aboveground tree biomass on timberland by ownership class, major species group, and tree biomass component, Michigan, 1993

(In green tons)

Ownership class and major species group	All components	Tree biomass component						
		All live 1-5 inch trees	Growing-stock trees			Nongrowing-stock trees		
			Stumps	Boles	Tops and limbs	Stumps	Boles	Tops and limbs
National forest								
Pine	33,166,395	4,057,053	1,697,879	23,750,128	2,829,215	50,618	699,250	82,252
Other softwoods	31,725,021	7,490,759	1,617,850	15,658,354	4,326,066	202,683	1,936,080	493,229
Soft hardwoods	61,722,187	8,595,693	2,281,452	32,339,679	9,990,451	427,067	6,271,615	1,816,230
Hard hardwoods	68,959,852	5,877,217	2,960,162	38,150,956	12,121,886	552,942	7,114,945	2,181,744
Total	195,573,455	26,020,722	8,557,343	109,899,117	29,267,618	1,233,310	16,021,890	4,573,455
Other federal								
Pine	697,252	98,361	36,282	481,701	57,421	1,424	19,850	2,213
Other softwoods	553,270	92,975	28,169	310,221	84,990	2,439	27,339	7,137
Soft hardwoods	1,482,982	140,164	57,530	867,229	252,758	7,204	125,906	32,191
Hard hardwoods	1,120,189	37,787	50,367	664,981	210,978	8,169	114,845	33,062
Total	3,853,693	369,287	172,348	2,324,132	606,147	19,236	287,940	74,603
State								
Pine	35,212,903	3,859,747	1,734,974	25,135,734	2,926,029	94,527	1,308,133	153,759
Other softwoods	49,407,879	12,395,945	2,679,655	23,717,139	6,800,689	328,682	2,742,796	742,973
Soft hardwoods	104,233,645	16,262,831	3,920,403	55,901,385	17,027,775	564,770	8,165,299	2,391,182
Hard hardwoods	79,275,473	6,759,179	3,579,188	45,762,758	14,604,029	481,432	6,224,716	1,864,171
Total	268,129,900	39,277,702	11,914,220	150,517,016	41,358,522	1,469,411	18,440,944	5,152,085
County and municipal								
Pine	2,521,375	258,567	126,476	1,814,391	226,273	5,772	79,187	10,709
Other softwoods	2,095,851	391,316	114,107	1,087,475	294,787	17,107	153,042	38,017
Soft hardwoods	7,341,616	950,807	277,135	4,019,124	1,210,168	42,963	664,794	176,625
Hard hardwoods	8,986,904	607,687	391,601	5,217,101	1,620,462	63,185	839,320	247,548
Total	20,945,746	2,208,377	909,319	12,138,091	3,351,690	129,027	1,736,343	472,899

(Table 26 continued on next page)

(Table 26 continued)

	All components	Tree biomass component						
		All live 1-5 inch trees	Growing-stock trees			Nongrowing-stock trees		
			Stumps	Boles	Tops and limbs	Stumps	Boles	Tops and limbs
Indian								
Pine	-	-	-	-	-	-	-	-
Other softwoods	259,710	91,647	11,396	122,330	31,264	217	2,351	505
Soft hardwoods	555,687	30,724	25,420	342,723	106,761	2,626	36,942	10,491
Hard hardwoods	687,419	51,604	30,436	414,989	132,055	3,949	38,901	15,485
Total	1,502,816	173,975	67,252	880,042	270,080	6,792	78,194	26,481
Forest industry								
Pine	2,504,635	125,897	117,392	1,960,230	210,230	4,835	77,649	8,402
Other softwoods	34,655,825	6,908,954	1,848,241	17,763,056	4,823,809	265,893	2,423,839	622,033
Soft hardwoods	38,483,306	4,884,741	1,485,699	20,455,727	6,338,995	271,572	3,902,324	1,144,248
Hard hardwoods	63,386,514	6,163,255	2,591,706	34,473,414	10,858,835	521,792	6,718,479	2,059,033
Total	139,030,280	18,082,847	6,043,038	74,652,427	22,231,869	1,064,092	13,122,291	3,833,716
Individual								
Pine	39,111,019	4,444,323	1,957,844	26,717,053	3,602,435	149,531	1,922,652	317,181
Other softwoods	78,165,748	20,813,252	4,068,337	37,007,653	10,533,923	475,439	4,146,361	1,120,783
Soft hardwoods	290,971,029	31,034,103	11,512,510	167,463,506	50,185,752	1,526,617	22,785,321	6,463,220
Hard hardwoods	282,298,494	23,992,792	12,178,382	164,101,087	50,846,898	1,692,746	22,772,887	6,713,702
Total	690,546,290	80,284,470	29,717,073	395,289,299	115,169,008	3,844,333	51,627,221	14,614,886
Corporate								
Pine	9,867,831	844,851	470,950	7,225,863	845,654	27,590	401,995	50,928
Other softwoods	29,047,959	6,196,775	1,505,141	14,801,216	4,033,792	189,513	1,856,502	465,020
Soft hardwoods	64,143,047	6,883,790	2,515,487	36,302,499	10,984,850	371,813	5,523,383	1,561,225
Hard hardwoods	72,303,458	6,206,508	3,050,224	40,886,930	12,764,958	517,941	6,811,597	2,065,300
Total	175,362,295	20,131,924	7,541,802	99,216,508	28,629,254	1,106,857	14,593,477	4,142,473
All ownerships								
Pine	123,081,410	13,688,799	6,141,797	87,085,100	10,697,257	334,297	4,508,716	625,444
Other softwoods	225,911,263	54,381,623	11,872,896	110,467,444	30,929,320	1,481,973	13,288,310	3,489,697
Soft hardwoods	568,933,499	68,782,853	22,075,636	317,691,872	96,097,510	3,214,632	47,475,584	13,595,412
Hard hardwoods	577,018,303	49,696,029	24,832,066	329,672,216	103,160,101	3,842,156	50,635,690	15,180,045
Total	1,494,944,475	186,549,304	64,922,395	844,916,632	240,884,188	8,873,058	115,908,300	32,890,598

Table 27. -- Area of land by land class, forest type, and Forest Survey Unit, Michigan, 1980 and 1993

(In thousand acres)

Land class	All Units		Eastern Upper Peninsula		Western Upper Peninsula		Northern Lower Peninsula		Southern Lower Peninsula	
and forest type	1980	1993	1980	1993	1980	1993	1980	1993	1980	1993
Forest land										
Timberland										
Jack pine	964.2	846.1	245.3	195.0	81.2	87.3	594.3	520.6	43.4	43.2
Red pine	588.2	897.2	107.8	158.2	58.2	97.8	387.3	591.8	34.9	49.4
White pine	199.4	233.8	72.1	68.1	42.6	46.2	70.1	95.9	14.6	23.6
Balsam fir	576.8	563.1	199.6	232.6	320.1	267.9	57.1	62.6	-	-
White fir	140.2	146.9	73.0	62.1	52.1	51.2	12.5	25.0	2.6	8.6
Black spruce	450.3	465.1	221.1	232.2	200.0	208.2	29.2	24.7	-	-
Northern white-cedar	1,292.6	1,349.4	655.4	632.9	256.2	291.3	368.0	419.2	13.0	6.0
Tamarack	121.6	148.9	45.3	54.5	39.6	48.4	32.3	38.2	4.4	7.8
Oak-hickory	1,768.4	1,981.8	25.9	37.6	23.7	29.0	1,051.0	1,168.8	667.8	746.4
Elm-ash-soft maple	1,422.1	1,626.9	226.6	220.7	182.0	189.0	462.9	545.9	550.6	671.3
Maple-beech-birch	6,218.7	7,161.3	1,150.5	1,264.3	2,396.2	2,465.8	1,741.4	2,130.3	930.6	1,300.9
Aspen	3,082.3	2,675.7	530.0	460.3	690.7	676.6	1,680.1	1,415.8	181.5	123.0
Paper birch	368.4	291.5	109.1	79.8	127.4	97.9	125.3	106.8	6.6	7.0
Balsam poplar	193.2	189.7	103.4	102.3	23.3	26.1	59.9	54.4	6.6	6.9
Nonstocked	86.2	38.5	25.9	8.3	14.7	6.7	30.3	16.9	15.3	6.6
Subtotal	17,472.6	18,615.9	3,791.0	3,808.9	4,508.0	4,589.4	6,701.7	7,216.9	2,471.9	3,000.7
Reserved forest land	680.9	574.7	144.8	120.9	269.3	229.6	182.0	171.2	84.8	53.0
Other forest land	194.3	90.2	67.9	46.2	42.4	17.5	79.0	26.5	5.0	-
All forest land	18,347.8	19,280.8	4,003.7	3,976.0	4,819.7	4,836.5	6,962.7	7,414.6	2,561.7	3,053.7
Nonforest land										
Cropland	11,707.3	10,008.3	412.6	337.7	174.4	158.8	2,375.8	1,919.7	8,744.5	7,592.1
Pasture	1,320.1	1,422.5	3.9	47.7	141.2	56.2	740.6	579.0	434.4	739.6
Other land[1]	4,749.9	5,646.6	466.6	627.8	289.2	468.4	1,221.9	1,431.9	2,772.2	3,118.5
All nonforest land	17,777.3	17,077.4	883.1	1,013.2	604.8	683.4	4,338.3	3,930.6	11,951.1	11,450.2
Total land	36,125.1	36,358.2	4,886.8	4,989.2	5,424.5	5,519.9	11,301.0	11,345.2	14,512.8	14,503.9

[1] The 1980 and 1993 totals for all units include 88.8 thousand acres and 183.5 thousand acres, respectively, of water according to FIA standards of area classification, but defined by the Bureau of the Census as land.

Table 28. -- Area of timberland by Forest Survey Unit and county, Michigan, 1980 and 1993

(In thousand acres)

Forest Survey Unit and county	1980	1993
Eastern Upper Peninsula		
Alger	489.3	471.4
Chippewa	703.2	707.7
Delta	573.6	595.5
Luce	466.7	463.4
Mackinac	521.7	522.2
Menominee	493.8	523.3
Schoolcraft	542.7	525.4
Total	3,791.0	3,808.9
Western Upper Peninsula		
Baraga	508.0	486.7
Dickinson	374.6	398.2
Gogebic	616.6	608.4
Houghton	509.5	528.9
Iron	651.8	658.0
Keweenaw	205.0	198.5
Marquette	971.4	1,005.1
Ontonagon	671.1	705.6
Total	4,508.0	4,589.4
Northern Lower Peninsula		
Alcona	307.7	321.9
Alpena	217.9	233.0
Antrim	157.5	189.7
Arenac	92.7	121.1
Bay	17.8	43.3
Benzie	119.1	136.9
Charlevoix	139.1	170.4
Cheboygan	367.5	339.6
Clare	216.5	245.5
Crawford	272.6	290.0
Emmet	195.8	197.6
Gladwin	193.4	186.9
Grand Traverse	154.5	170.9
Iosco	225.1	242.6
Isabella	78.6	101.6
Kalkaska	253.7	267.4
Lake	300.2	315.2
Leelanau	76.0	88.4
Manistee	225.7	249.1
Mason	148.2	157.0
Mecosta	120.5	163.4
Midland	148.2	175.6
Missaukee	205.1	229.3
Montmorency	301.1	293.6
Newaygo	310.2	330.4
Oceana	148.4	182.0
Ogemaw	219.7	228.5
Osceola	157.2	185.6
Oscoda	307.5	307.9
Otsego	260.9	239.6
Presque Isle	266.5	298.8
Roscommon	247.1	254.8
Wexford	249.7	259.3
Total	6,701.7	7,216.9

(Table 28 continued on next page)

(Table 28 continued)

Forest Survey Unit and county	1980	1993
Southern Lower Peninsula		
Allegan	138.1	178.4
Barry	111.9	111.2
Berrien	66.4	67.0
Branch	44.3	54.4
Calhoun	76.4	110.6
Cass	54.1	76.9
Clinton	30.7	53.8
Eaton	45.8	82.1
Genesee	44.3	64.9
Gratiot	27.5	49.2
Hillsdale	45.2	74.1
Huron	56.2	64.5
Ingham	42.3	62.0
Ionia	37.2	74.6
Jackson	83.8	82.3
Kalamazoo	67.0	75.0
Kent	123.3	155.5
Lapeer	81.2	109.4
Lenawee	47.9	55.2
Livingston	69.6	94.1
Macomb	45.0	60.6
Monroe	35.2	37.9
Montcalm	144.9	133.0
Muskegon	164.4	159.9
Oakland	82.3	111.2
Ottawa	77.8	79.1
Saginaw	82.9	98.9
St. Clair	88.1	78.3
St. Joseph	60.4	65.6
Sanilac	50.2	79.9
Shiawassee	53.1	50.2
Tuscola	84.0	115.5
Van Buren	102.4	122.3
Washtenaw	72.2	82.2
Wayne	35.8	30.9
Total	2,471.9	3,000.7
All counties	17,472.6	18,615.9

Table 29. -- Area of timberland by Forest Survey Unit and stand-size class, Michigan, 1980 and 1993

(In thousand acres)

Forest Survey Unit and stand-size class	1980	1993
Eastern Upper Peninsula		
Sawtimber	1,122.5	1,553.4
Poletimber	1,723.6	1,130.0
Sapling & seedling	919.0	1,117.2
Nonstocked	25.9	8.3
Total	3,791.0	3,808.9
Western Upper Peninsula		
Sawtimber	1,830.2	2,274.6
Poletimber	1,934.6	1,293.5
Sapling & seedling	728.5	1,014.6
Nonstocked	14.7	6.7
Total	4,508.0	4,589.4
Northern Lower Peninsula		
Sawtimber	1,581.8	3,052.8
Poletimber	3,115.6	2,454.7
Sapling & seedling	1,974.0	1,692.5
Nonstocked	30.3	16.9
Total	6,701.7	7,216.9
Southern Lower Peninsula		
Sawtimber	1,001.6	1,724.1
Poletimber	693.4	663.1
Sapling & seedling	761.6	606.9
Nonstocked	15.3	6.6
Total	2,471.9	3,000.7
All units		
Sawtimber	5,536.1	8,604.9
Poletimber	7,467.2	5,541.3
Sapling & seedling	4,383.1	4,431.2
Nonstocked	86.2	38.5
Total	17,472.6	18,615.9

Table 30. -- Area of land by land-use class and Forest Survey Unit, Michigan, 1993

(In thousand acres)

Land-use class	All Units	Forest Survey Unit			
		Eastern Upper Peninsula	Western Upper Peninsula	Northern Lower Peninsula	Southern Lower Peninsula
Forest land					
Timberland	18,615.9	3,808.9	4,589.4	7,216.9	3,000.7
Reserved forest land	574.7	120.9	229.6	171.2	53.0
Other forest land	90.2	46.2	17.5	26.5	-
All forest land	19,280.8	3,976.0	4,836.5	7,414.6	3,053.7
Nonforest land					
Nonforest with trees					
Cropland with trees	54.7	4.5	1.9	29.0	19.3
Improved pasture with trees	65.5	5.9	2.1	24.3	33.2
Wooded strips	131.4	9.1	1.1	10.9	110.3
Idle farmland with trees	61.6	9.0	6.0	36.8	9.8
Marsh with trees	293.1	82.0	32.5	109.9	68.7
Urban and other with trees	946.3	50.5	41.7	285.2	568.9
Windbreaks	40.9	-	-	2.7	38.2
Wooded pasture	2.3	-	-	2.3	-
Total	1,595.8	161.0	85.3	501.1	848.4
Nonforest without trees					
Cropland	9,953.6	333.2	156.9	1,890.7	7,572.8
Improved pasture	1,354.7	41.8	54.1	552.4	706.4
Idle farmland	34.4	1.3	-	16.0	17.1
Marsh	779.6	289.3	115.4	208.6	166.3
Other farm-farmstead	507.5	20.9	26.6	160.3	299.7
Urban and other	2,668.3	141.9	200.6	561.1	1,764.7
Noncensus water	183.5	23.8	44.5	40.4	74.8
Total	15,481.6	852.2	598.1	3,429.5	10,601.8
All nonforest land	17,077.4	1,013.2	683.4	3,930.6	11,450.2
Total land	36,358.2	4,989.2	5,519.9	11,345.2	14,503.9
Census water	25,600.7	5,870.7	6,809.2	8,317.4	4,603.4
Total land and water	61,958.9	10,859.9	12,329.1	19,662.6	19,107.3

Table 31. -- Area of timberland by ownership class, potential productivity class, and Forest Survey Unit, Michigan, 1993

(In thousand acres)

Forest Survey Unit and ownership class	All classes	Potential productivity class (cubic feet of growth per acre per year)				
		165+	120-164	85-119	50-84	20-49
Eastern Upper Peninsula						
National forest	763.9	-	24.5	124.3	297.9	317.2
Other federal	20.5	-	1.3	3.9	9.0	6.3
State	937.2	-	18.5	111.9	318.7	488.1
County and municipal	12.7	1.1	-	2.9	7.0	1.7
Indian	8.2	-	-	1.3	2.6	4.3
Forest industry	422.4	-	9.7	46.0	145.3	221.4
Individual	1,241.9	3.1	45.6	188.8	503.9	500.5
Corporate	402.1	-	9.3	37.2	148.2	207.4
All ownerships	3,808.9	4.2	108.9	516.3	1,432.6	1,746.9
Western Upper Peninsula						
National forest	863.4	-	70.6	167.8	427.4	197.6
Other federal	17.1	-	1.1	4.2	9.1	2.7
State	616.7	2.6	21.4	112.4	265.4	214.9
County and municipal	90.0	-	1.7	15.6	40.0	32.7
Indian	6.4	-	-	-	5.1	1.3
Forest industry	1,085.7	-	26.7	153.4	440.9	464.7
Individual	1,076.7	2.1	32.0	192.6	538.6	311.4
Corporate	833.4	4.1	33.3	149.4	381.9	264.7
All ownerships	4,589.4	8.8	186.8	795.4	2,108.4	1,490.0
Northern Lower Peninsula						
National forest	900.9	0.5	56.1	210.3	352.1	281.9
Other federal	12.0	-	2.1	1.7	4.1	4.1
State	1,936.3	3.9	60.1	380.6	812.7	679.0
County and municipal	68.0	5.9	3.9	20.9	17.6	19.7
Forest industry	6.2	-	-	-	6.2	-
Individual	3,726.8	21.0	189.5	1,036.4	1,565.2	914.7
Corporate	566.7	3.7	28.1	141.0	240.2	153.7
All ownerships	7,216.9	35.0	339.8	1,790.9	2,998.1	2,053.1
Southern Lower Peninsula						
National forest	14.2	-	-	4.8	7.3	2.1
State	238.0	3.9	28.8	69.2	109.2	26.9
County and municipal	85.6	-	10.2	18.2	45.0	12.2
Individual	2,403.1	60.7	151.1	1,059.5	918.7	213.1
Corporate	259.8	9.7	12.0	133.4	90.8	13.9
All ownerships	3,000.7	74.3	202.1	1,285.1	1,171.0	268.2
All units						
National forest	2,542.4	0.5	151.2	507.2	1,084.7	798.8
Other federal	49.6	-	4.5	9.8	22.2	13.1
State	3,728.2	10.4	128.8	674.1	1,506.0	1,408.9
County and municipal	256.3	7.0	15.8	57.6	109.6	66.3
Indian	14.6	-	-	1.3	7.7	5.6
Forest industry	1,514.3	-	36.4	199.4	592.4	686.1
Individual	8,448.5	86.9	418.2	2,477.3	3,526.4	1,939.7
Corporate	2,062.0	17.5	82.7	461.0	861.1	639.7
All ownerships	18,615.9	122.3	837.6	4,387.7	7,710.1	5,558.2

Table 32. -- Area of privately[1] owned timberland by ownership class and size of holding, Michigan, 1993

(In thousand acres)

Ownership class	All sizes	Size of holding (acres)								
		1-4	5-10	11-20	21-50	51-100	101-500	501-2,500	2,501-5,000	5,001+
Forest industry	1,514.3	-	-	-	1.1	1.3	11.4	14.1	7.7	1,478.7
Individual	8,448.5	248.2	470.0	891.5	2,692.7	1,861.3	1,880.2	337.3	28.0	39.3
Corporate	2,062.0	7.2	17.4	32.5	163.2	107.7	318.5	252.7	162.1	1,000.7
All private ownerships	12,024.8	255.4	487.4	924.0	2,857.0	1,970.3	2,210.1	604.1	197.8	2,518.7

[1]Does not include 14.6 thousand acres of Indian owned timberland.

Table 33. -- Area of timberland by ownership class, stand-volume class (board feet) and Forest Survey Unit, Michigan, 1993

(In thousand acres)

Forest Survey Unit and ownership class	All classes	Stand-volume class (board feet)[1]		
		Less than 1,500	1,500-4,999	5,000+
Eastern Upper Peninsula				
National forest	763.9	287.5	243.7	232.7
Other federal	20.5	7.2	6.3	7.0
State	937.2	342.2	332.4	262.6
County and municipal	12.7	6.0	5.1	1.6
Indian	8.2	4.3	3.9	-
Forest industry	422.4	154.2	108.1	160.1
Individual	1,241.9	448.5	437.6	355.8
Corporate	402.1	127.8	133.3	141.0
All ownerships	3,808.9	1,377.7	1,270.4	1,160.8
Western Upper Peninsula				
National forest	863.4	221.3	326.0	316.1
Other federal	17.1	3.8	5.1	8.2
State	616.7	207.1	195.3	214.3
County and municipal	90.0	23.2	40.2	26.6
Indian	6.4	-	1.3	5.1
Forest industry	1,085.7	248.1	321.4	516.2
Individual	1,076.7	303.8	383.8	389.1
Corporate	833.4	198.1	285.1	350.2
All ownerships	4,589.4	1,205.4	1,558.2	1,825.8
Northern Lower Peninsula				
National forest	900.9	310.9	363.0	227.0
Other federal	12.0	4.1	5.7	2.2
State	1,936.3	831.1	640.9	464.3
County and municipal	68.0	21.6	22.7	23.7
Forest industry	6.2	0.6	-	5.6
Individual	3,726.8	1,187.0	1,284.0	1,255.8
Corporate	566.7	166.8	192.8	207.1
All ownerships	7,216.9	2,522.1	2,509.1	2,185.7
Southern Lower Peninsula				
National forest	14.2	5.1	4.9	4.2
State	238.0	54.6	70.1	113.3
County and municipal	85.6	29.9	23.3	32.4
Individual	2,403.1	767.0	692.7	943.4
Corporate	259.8	82.9	85.0	91.9
All ownerships	3,000.7	939.5	876.0	1,185.2
All units				
National forest	2,542.4	824.8	937.6	780.0
Other federal	49.6	15.1	17.1	17.4
State	3,728.2	1,435.0	1,238.7	1,054.5
County and municipal	256.3	80.7	91.3	84.3
Indian	14.6	4.3	5.2	5.1
Forest industry	1,514.3	402.9	429.5	681.9
Individual	8,448.5	2,706.3	2,798.1	2,944.1
Corporate	2,062.0	575.6	696.2	790.2
All ownerships	18,615.9	6,044.7	6,213.7	6,357.5

[1]International 1/4-inch rule.

Table 34. -- Area of timberland by forest type, stand-size class, and ownership class, Michigan, 1993

(In thousand acres)

Forest type and stand-size class	All ownerships	Ownership class							
		National forest	Other federal	State	County and municipal	Indian	Forest industry	Individual	Corporate
Jack pine									
Sawtimber	258.0	40.4	7.1	114.9	6.5	-	4.2	67.5	17.4
Poletimber	349.6	101.1	4.8	114.2	7.3	-	-	106.5	15.7
Sapling and seedling	238.5	66.8	3.4	104.2	4.3	-	3.2	36.2	20.4
All stands	846.1	208.3	15.3	333.3	18.1	-	7.4	210.2	53.5
Red pine									
Sawtimber	430.7	152.9	3.7	132.6	8.6	-	4.0	109.1	19.8
Poletimber	344.0	121.7	-	86.9	11.1	-	1.6	101.6	21.1
Sapling and seedling	122.5	48.2	-	20.1	-	-	16.8	22.7	14.7
All stands	897.2	322.8	3.7	239.6	19.7	-	22.4	233.4	55.6
White pine									
Sawtimber	173.8	35.1	-	40.1	-	-	4.7	60.7	33.2
Poletimber	30.5	4.3	1.3	10.8	-	-	-	14.1	-
Sapling and seedling	29.5	2.4	-	11.7	-	-	-	13.0	2.4
All stands	233.8	41.8	1.3	62.6	-	-	4.7	87.8	35.6
Balsam fir									
Sawtimber	177.3	30.0	2.6	33.2	1.3	-	22.4	58.3	29.5
Poletimber	158.2	30.5	2.6	19.0	3.5	-	22.0	62.8	17.8
Sapling and seedling	227.6	30.8	-	60.3	1.7	-	46.8	59.0	29.0
All stands	563.1	91.3	5.2	112.5	6.5	-	91.2	180.1	76.3
White spruce									
Sawtimber	47.1	8.8	-	10.7	-	-	4.8	14.0	8.8
Poletimber	48.9	15.2	-	9.2	-	-	1.1	15.7	7.7
Sapling and seedling	50.9	15.5	-	5.6	-	-	4.0	21.9	3.9
All stands	146.9	39.5	-	25.5	-	-	9.9	51.6	20.4
Black spruce									
Sawtimber	49.5	17.2	-	12.1	1.3	-	6.9	7.6	4.4
Poletimber	141.1	20.6	-	46.4	2.1	-	17.1	42.8	12.1
Sapling and seedling	274.5	51.8	-	84.5	-	-	42.6	68.4	27.2
All stands	465.1	89.6	-	143.0	3.4	-	66.6	118.8	43.7
Northern white-cedar									
Sawtimber	594.8	62.8	-	159.1	10.8	-	116.7	186.1	59.3
Poletimber	582.2	62.2	-	172.5	5.8	-	58.5	224.3	58.9
Sapling and seedling	172.4	20.0	-	31.3	-	1.6	20.6	93.9	5.0
All stands	1,349.4	145.0	-	362.9	16.6	1.6	195.8	504.3	123.2
Tamarack									
Sawtimber	31.5	-	-	11.0	4.3	-	1.7	7.8	6.7
Poletimber	40.2	1.8	-	12.5	-	-	5.0	17.6	3.3
Sapling and seedling	77.2	17.7	-	17.6	0.9	-	6.6	26.2	8.2
All stands	148.9	19.5	-	41.1	5.2	-	13.3	51.6	18.2

(Table 34 continued on next page)

(Table 34 continued)

Forest type and stand-size class	All ownerships	National forest	Other federal	State	County and municipal	Indian	Forest industry	Individual	Corporate
Oak-hickory									
Sawtimber	1,230.0	108.8	-	233.4	17.2	-	7.6	750.3	112.7
Poletimber	457.1	100.5	-	109.0	9.2	-	0.9	204.8	32.7
Sapling and seedling	294.7	62.2	-	79.6	6.3	-	1.3	122.0	23.3
All stands	1,981.8	271.5	-	422.0	32.7	-	9.8	1,077.1	168.7
Elm-ash-soft maple									
Sawtimber	756.5	47.9	-	97.6	13.5	-	34.7	465.3	97.5
Poletimber	469.8	45.3	-	68.1	4.2	1.8	8.5	298.1	43.8
Sapling and seedling	400.6	15.3	-	60.7	3.7	-	11.7	274.3	34.9
All stands	1,626.9	108.5	-	226.4	21.4	1.8	54.9	1,037.7	176.2
Maple-birch									
Sawtimber	3,848.4	450.0	8.2	444.0	46.4	3.8	590.0	1,777.1	528.9
Poletimber	1,979.2	252.4	3.8	325.8	32.6	5.2	182.1	939.1	238.2
Sapling and seedling	1,333.7	132.9	-	199.5	29.7	-	96.3	708.1	167.2
All stands	7,161.3	835.3	12.0	969.3	108.7	9.0	868.4	3,424.3	934.3
Aspen									
Sawtimber	850.7	85.5	4.9	176.2	6.7	1.3	20.5	445.9	109.7
Poletimber	720.6	77.8	3.0	134.2	8.5	-	23.5	400.8	72.8
Sapling and seedling	1,104.4	165.9	3.2	360.8	8.0	-	83.2	374.6	108.7
All stands	2,675.7	329.2	11.1	671.2	23.2	1.3	127.2	1,221.3	291.2
Paper birch									
Sawtimber	90.4	8.7	-	24.2	-	-	12.9	28.6	16.0
Poletimber	166.8	10.5	1.0	46.3	-	-	7.2	72.4	29.4
Sapling and seedling	34.3	-	-	4.5	-	0.9	4.7	19.8	4.4
All stands	291.5	19.2	1.0	75.0	-	0.9	24.8	120.8	49.8
Balsam poplar									
Sawtimber	66.2	2.6	-	15.8	-	-	5.5	38.7	3.6
Poletimber	53.1	6.9	-	6.9	-	-	5.4	29.7	4.2
Sapling and seedling	70.4	11.4	-	5.2	-	-	7.0	42.4	4.4
All stands	189.7	20.9	-	27.9	-	-	17.9	110.8	12.2
Nonstocked	38.5	-	-	15.9	0.8	-	-	18.7	3.1
All forest types									
Sawtimber	8,604.9	1,050.7	26.5	1,504.9	116.6	5.1	836.6	4,017.0	1,047.5
Poletimber	5,541.3	850.8	16.5	1,161.8	84.3	7.0	332.9	2,530.3	557.7
Sapling and seedling	4,431.2	640.9	6.6	1,045.6	54.6	2.5	344.8	1,882.5	453.7
Nonstocked	38.5	-	-	15.9	0.8	-	-	18.7	3.1
All stands	18,615.9	2,542.4	49.6	3,728.2	256.3	14.6	1,514.3	8,448.5	2,062.0

Table 35. -- Area of timberland by forest type, stand-size class, and potential productivity class, Michigan, 1993

(In thousand acres)

Forest type and stand-size class	All classes	Potential productivity class (cubic feet of growth per acre per year)				
		165+	120-164	85-119	50-84	20-49
Jack pine						
Sawtimber	258.0	-	7.9	13.2	103.2	133.7
Poletimber	349.6	-	17.0	28.0	71.4	233.2
Sapling and seedling	238.5	-	1.6	7.1	35.7	194.1
All stands	846.1	-	26.5	48.3	210.3	561.0
Red pine						
Sawtimber	430.7	-	108.2	200.7	99.0	22.8
Poletimber	344.0	-	102.2	153.7	76.9	11.2
Sapling and seedling	122.5	-	10.6	43.9	50.7	17.3
All stands	897.2	-	221.0	398.3	226.6	51.3
White pine						
Sawtimber	173.8	-	23.8	46.0	73.8	30.2
Poletimber	30.5	-	4.6	8.4	7.4	10.1
Sapling and seedling	29.5	-	3.3	13.6	5.7	6.9
All stands	233.8	-	31.7	68.0	86.9	47.2
Balsam fir						
Sawtimber	177.3	2.6	70.7	73.6	19.0	11.4
Poletimber	158.2	1.8	54.5	77.3	14.7	9.9
Sapling and seedling	227.6	-	66.6	60.0	52.2	48.8
All stands	563.1	4.4	191.8	210.9	85.9	70.1
White spruce						
Sawtimber	47.1	-	-	15.8	26.8	4.5
Poletimber	48.9	-	-	16.8	21.5	10.6
Sapling and seedling	50.9	0.9	2.3	17.8	26.0	3.9
All stands	146.9	0.9	2.3	50.4	74.3	19.0
Black spruce						
Sawtimber	49.5	-	-	6.7	28.8	14.0
Poletimber	141.1	-	1.7	16.0	35.9	87.5
Sapling and seedling	274.5	-	-	14.1	37.0	223.4
All stands	465.1	-	1.7	36.8	101.7	324.9
Northern white-cedar						
Sawtimber	594.8	-	-	13.0	174.4	407.4
Poletimber	582.2	-	-	9.6	117.1	455.5
Sapling and seedling	172.4	-	-	3.0	33.9	135.5
All stands	1,349.4	-	-	25.6	325.4	998.4
Tamarack						
Sawtimber	31.5	-	-	6.7	9.5	15.3
Poletimber	40.2	-	-	1.7	13.9	24.6
Sapling and seedling	77.2	-	-	1.2	22.9	53.1
All stands	148.9	-	-	9.6	46.3	93.0

(Table 35 continued on next page)

(Table 35 continued)

Forest type and stand-size class	All classes	Potential productivity class (cubic feet of growth per acre per year)				
		165+	120-164	85-119	50-84	20-49
Oak-hickory						
Sawtimber	1,230.0	12.6	24.0	355.1	623.0	215.3
Poletimber	457.1	3.9	2.1	86.2	229.2	135.7
Sapling and seedling	294.7	-	-	42.4	144.3	108.0
All stands	1,981.8	16.5	26.1	483.7	996.5	459.0
Elm-ash-soft maple						
Sawtimber	756.5	-	33.1	233.5	246.1	243.8
Poletimber	469.8	-	2.4	94.9	136.3	236.2
Sapling and seedling	400.6	-	7.5	43.4	155.4	194.3
All stands	1,626.9	-	43.0	371.8	537.8	674.3
Maple-beech-birch						
Sawtimber	3,848.4	60.4	88.3	892.4	1,877.4	929.9
Poletimber	1,979.2	15.6	37.4	383.2	1,083.0	460.0
Sapling and seedling	1,333.7	2.0	13.3	277.0	657.1	384.3
All stands	7,161.3	78.0	139.0	1,552.6	3,617.5	1,774.2
Aspen						
Sawtimber	850.7	12.0	66.3	374.7	347.1	50.6
Poletimber	720.6	1.8	43.0	274.2	325.1	76.5
Sapling and seedling	1,104.4	8.7	39.9	404.7	504.9	146.2
All stands	2,675.7	22.5	149.2	1,053.6	1,177.1	273.3
Paper birch						
Sawtimber	90.4	-	-	7.6	35.5	47.3
Poletimber	166.8	-	1.8	8.4	77.6	79.0
Sapling and seedling	34.3	-	1.4	-	14.3	18.6
All stands	291.5	-	3.2	16.0	127.4	144.9
Balsam poplar						
Sawtimber	66.2	-	-	15.6	33.6	17.0
Poletimber	53.1	-	2.1	15.4	29.5	6.1
Sapling and seedling	70.4	-	-	23.5	23.8	23.1
All stands	189.7	-	2.1	54.5	86.9	46.2
Nonstocked	38.5	-	-	7.6	9.5	21.4
All forest types						
Sawtimber	8,604.9	87.6	422.3	2,254.6	3,697.2	2,143.2
Poletimber	5,541.3	23.1	268.8	1,173.8	2,239.5	1,836.1
Sapling and seedling	4,431.2	11.6	146.5	951.7	1,763.9	1,557.5
Nonstocked	38.5	-	-	7.6	9.5	21.4
All stands	18,615.9	122.3	837.6	4,387.7	7,710.1	5,558.2

Table 36. -- Area of timberland by forest type, stand-age class, and Forest Survey Unit, Michigan, 1993

(In thousand acres)

Forest Survey Unit and forest type	All classes	Stand-age class (years) 1-20	21-40	41-60	61-80	81-100	101-120	121-140	141+
Eastern Upper Peninsula									
Jack pine	195.0	20.8	42.5	85.3	33.5	9.6	3.3	-	-
Red pine	158.2	30.6	42.1	56.4	16.5	10.1	0.5	2.0	-
White pine	68.1	9.9	4.4	13.2	17.3	3.0	8.3	5.9	6.1
Balsam fir	232.6	76.2	48.0	62.7	31.8	5.3	7.5	1.1	-
White spruce	62.1	9.0	21.2	16.6	12.8	2.5	-	-	-
Black spruce	232.2	30.3	110.2	54.2	24.1	7.9	3.2	2.3	-
Northern white-cedar	632.9	16.2	87.8	111.6	139.5	111.9	70.5	48.2	47.2
Tamarack	54.5	8.6	7.5	18.9	9.8	8.5	-	1.2	-
Oak-hickory	37.6	16.3	4.1	7.7	6.3	1.9	1.3	-	-
Elm-ash-soft maple	220.7	39.7	32.7	63.3	33.8	15.5	10.6	18.2	6.9
Maple-beech-birch	1,264.3	161.4	123.4	262.4	265.0	203.2	105.1	98.1	45.7
Aspen	460.3	164.6	76.8	96.8	94.3	20.0	6.6	1.2	-
Paper birch	79.8	5.7	8.8	24.5	29.1	5.4	3.7	2.6	-
Balsam poplar	102.3	34.3	17.8	24.2	13.3	5.3	3.6	3.8	-
Nonstocked	8.3	8.3	-	-	-	-	-	-	-
All forest types	3,808.9	631.9	627.3	897.8	727.1	410.1	224.2	184.6	105.9
Western Upper Peninsula									
Jack pine	87.3	25.7	11.2	27.8	16.6	2.8	1.4	1.8	-
Red pine	97.8	28.1	26.0	18.6	4.4	13.0	6.5	1.2	-
White pine	46.2	4.0	1.4	6.1	8.2	19.4	5.8	-	1.3
Balsam fir	267.9	42.6	63.2	70.3	46.8	31.3	7.6	3.6	2.5
White spruce	51.2	3.2	16.3	11.8	10.4	6.7	2.8	-	-
Black spruce	208.2	29.3	69.6	40.6	54.2	12.7	-	1.8	-
Northern white-cedar	291.3	5.1	19.2	40.7	57.3	57.4	39.9	32.8	38.9
Tamarack	48.4	10.3	7.3	16.9	5.9	2.0	2.4	1.1	2.5
Oak-hickory	29.0	3.1	1.4	3.7	9.0	5.1	5.6	-	1.1
Elm-ash-soft maple	189.0	23.3	28.0	33.9	45.3	19.9	11.3	10.9	16.4
Maple-beech-birch	2,465.8	215.4	171.0	550.0	483.5	416.2	278.0	210.2	141.5
Aspen	676.6	262.7	99.7	156.3	116.8	32.1	4.7	4.3	-
Paper birch	97.9	1.6	6.4	31.2	43.8	7.4	2.5	2.4	2.6
Balsam poplar	26.1	1.2	5.5	7.1	8.1	2.4	1.8	-	-
Nonstocked	6.7	6.7	-	-	-	-	-	-	-
All forest types	4,589.4	662.3	526.2	1,015.0	910.3	628.4	370.3	270.1	206.8
Northern Lower Peninsula									
Jack pine	520.6	123.7	185.7	137.7	54.8	18.7	-	-	-
Red pine	591.8	80.4	279.3	159.3	25.8	31.9	7.6	7.5	-
White pine	95.9	5.2	24.0	14.8	20.9	18.0	9.7	0.8	2.5
Balsam fir	62.6	7.7	25.2	7.5	17.6	2.4	-	-	2.2
White spruce	25.0	5.4	10.6	1.5	6.3	-	-	-	1.2
Black spruce	24.7	6.9	5.2	3.1	8.2	1.3	-	-	-
Northern white-cedar	419.2	7.5	27.8	56.2	122.4	91.5	44.8	39.4	29.6
Tamarack	38.2	4.4	11.3	11.6	3.8	3.2	3.3	0.6	-
Oak-hickory	1,168.8	154.6	116.0	250.1	319.5	163.3	91.8	55.0	18.5
Elm-ash-soft maple	545.9	109.1	120.8	131.2	85.3	54.4	30.2	7.5	7.4
Maple-beech-birch	2,130.3	401.0	266.7	543.4	477.0	249.5	107.3	62.2	23.2
Aspen	1,415.8	404.4	327.0	311.0	239.5	95.7	23.4	10.6	4.2
Paper birch	106.8	7.5	13.4	31.8	37.6	10.0	2.0	4.5	-
Balsam poplar	54.4	23.1	4.6	8.7	10.4	3.3	-	-	4.3
Nonstocked	16.9	15.0	1.9	-	-	-	-	-	-
All forest types	7,216.9	1,355.9	1,419.5	1,667.9	1,429.1	743.2	320.1	188.1	93.1

(Table 36 continued on next page)

(Table 36 continued)

Forest Survey Unit and forest type	All classes	Stand-age class (years) 1-20	21-40	41-60	61-80	81-100	101-120	121-140	141+
Southern Lower Peninsula									
Jack pine	43.2	6.5	21.8	11.8	3.1	-	-	-	-
Red pine	49.4	-	22.0	24.8	2.6	-	-	-	-
White pine	23.6	6.3	12.7	1.9	2.7	-	-	-	-
White spruce	8.6	3.7	4.9	-	-	-	-	-	-
Northern white-cedar	6.0	-	3.0	-	3.0	-	-	-	-
Tamarack	7.8	-	4.8	3.0	-	-	-	-	-
Oak-hickory	746.4	87.3	52.9	120.6	162.7	173.7	75.4	65.2	8.6
Elm-ash-soft maple	671.3	135.2	148.7	128.3	138.5	66.0	41.6	13.0	-
Maple-beech-birch	1,300.9	271.0	312.8	288.8	198.5	127.4	77.3	20.6	4.5
Aspen	123.0	66.1	39.1	3.0	11.8	-	-	-	3.0
Paper birch	7.0	7.0	-	-	-	-	-	-	-
Balsam poplar	6.9	-	1.1	2.9	2.9	-	-	-	-
Nonstocked	6.6	-	6.6	-	-	-	-	-	-
All forest types	3,000.7	583.1	630.4	585.1	525.8	367.1	194.3	98.8	16.1
All units									
Jack pine	846.1	176.7	261.2	262.6	108.0	31.1	4.7	1.8	-
Red pine	897.2	139.1	369.4	259.1	49.3	55.0	14.6	10.7	-
White pine	233.8	25.4	42.5	36.0	49.1	40.4	23.8	6.7	9.9
Balsam fir	563.1	126.5	136.4	140.5	96.2	39.0	15.1	4.7	4.7
White spruce	146.9	21.3	53.0	29.9	29.5	9.2	2.8	-	1.2
Black spruce	465.1	66.5	185.0	97.9	86.5	21.9	3.2	4.1	-
Northern white-cedar	1,349.4	28.8	137.8	208.5	322.2	260.8	155.2	120.4	115.7
Tamarack	148.9	23.3	30.9	50.4	19.5	13.7	5.7	2.9	2.5
Oak-hickory	1,981.8	261.3	174.4	382.1	497.5	344.0	174.1	120.2	28.2
Elm-ash-soft maple	1,626.9	307.3	330.2	356.7	302.9	155.8	93.7	49.6	30.7
Maple-beech-birch	7,161.3	1,048.8	873.9	1,644.6	1,424.0	996.3	567.7	391.1	214.9
Aspen	2,675.7	897.8	542.6	567.1	462.4	147.8	34.7	16.1	7.2
Paper birch	291.5	21.8	28.6	87.5	110.5	22.8	8.2	9.5	2.6
Balsam poplar	189.7	58.6	29.0	42.9	34.7	11.0	5.4	3.8	4.3
Nonstocked	38.5	30.0	8.5	-	-	-	-	-	-
All forest types	18,615.9	3,233.2	3,203.4	4,165.8	3,592.3	2,148.8	1,108.9	741.6	421.9

Table 37. -- Area of timberland by forest type, site-index class, and Forest Survey Unit, Michigan, 1993

(In thousand acres)

Forest Survey Unit and forest type	All classes	Site-index class (height in feet of dominant and codominant site trees at 50 years of age)								
		11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91+
Eastern Upper Peninsula										
Jack pine	195.0	-	-	8.7	66.0	75.4	39.5	5.4	-	-
Red pine	158.2	-	-	2.7	21.3	44.5	53.6	33.1	3.0	-
White pine	68.1	-	-	4.7	23.2	22.1	15.8	2.3	-	-
Balsam fir	232.6	-	2.4	42.4	54.8	67.0	42.2	22.0	1.8	-
White spruce	62.1	-	-	4.1	17.1	19.3	16.3	1.4	3.9	-
Black spruce	232.2	3.5	29.9	62.9	83.7	46.6	5.6	-	-	-
Northern white-cedar	632.9	20.7	213.0	185.6	116.1	65.0	23.1	9.4	-	-
Tamarack	54.5	-	11.0	24.5	11.1	4.5	1.1	2.3	-	-
Oak-hickory	37.6	-	-	11.4	1.3	12.2	6.8	3.3	2.6	-
Elm-ash-soft maple	220.7	-	8.5	21.3	49.7	72.5	50.1	14.7	3.9	-
Maple-beech-birch	1,264.3	-	5.2	21.3	103.3	360.9	483.2	231.2	50.2	9.0
Aspen	460.3	-	-	23.2	48.6	118.2	106.9	123.2	38.9	1.3
Paper birch	79.8	-	-	6.5	10.1	22.1	35.4	3.9	-	1.8
Balsam poplar	102.3	-	-	4.6	19.4	19.2	34.4	19.2	5.5	-
Nonstocked	8.3	1.2	-	1.1	2.1	-	3.9	-	-	-
All forest types	3,808.9	25.4	270.0	425.0	627.8	949.5	917.9	471.4	109.8	12.1
Western Upper Peninsula										
Jack pine	87.3	-	-	5.1	13.5	19.8	24.7	22.8	1.4	-
Red pine	97.8	-	-	1.8	6.4	22.1	20.6	41.9	5.0	-
White pine	46.2	-	-	2.8	9.4	17.0	7.4	6.3	3.3	-
Balsam fir	267.9	1.3	1.9	19.3	63.0	88.0	64.0	26.3	4.1	-
White spruce	51.2	-	-	1.2	7.7	17.3	20.0	4.1	-	0.9
Black spruce	208.2	-	9.9	53.1	79.6	47.5	12.0	6.1	-	-
Northern white-cedar	291.3	14.5	87.5	74.7	65.1	33.0	16.5	-	-	-
Tamarack	48.4	-	1.4	7.1	18.9	16.3	3.0	1.7	-	-
Oak-hickory	29.0	-	-	-	8.8	4.6	11.3	2.9	1.4	-
Elm-ash-soft maple	189.0	-	5.8	21.1	44.2	56.0	41.1	16.7	4.1	-
Maple-beech-birch	2,465.8	-	3.8	32.3	224.8	630.1	879.4	547.2	133.5	14.7
Aspen	676.6	-	0.8	8.9	21.8	108.3	205.0	194.0	111.9	25.9
Paper birch	97.9	-	-	1.3	8.7	35.4	33.3	15.6	3.6	-
Balsam poplar	26.1	-	-	-	-	3.9	12.2	7.2	2.8	-
Nonstocked	6.7	-	-	-	0.8	4.2	1.7	-	-	-
All forest types	4,589.4	15.8	111.1	228.7	572.7	1,103.5	1,352.2	892.8	271.1	41.5
Northern Lower Peninsula										
Jack pine	520.6	-	-	90.2	196.7	149.8	61.5	15.2	5.7	1.5
Red pine	591.8	-	-	11.7	64.2	131.7	180.2	158.9	45.1	-
White pine	95.9	-	-	2.9	26.7	37.5	9.3	13.2	6.3	-
Balsam fir	62.6	-	-	12.9	16.2	13.4	10.6	7.4	2.1	-
White spruce	25.0	-	2.4	5.9	2.2	2.3	3.4	7.8	-	1.0
Black spruce	24.7	-	-	7.8	10.6	1.2	1.5	-	3.6	-
Northern white-cedar	419.2	8.7	76.6	146.0	97.5	63.3	18.0	7.4	1.7	-
Tamarack	38.2	-	1.0	6.8	17.4	3.7	6.7	2.6	-	-
Oak-hickory	1,168.8	-	-	33.9	199.7	374.5	301.6	180.1	65.2	13.8
Elm-ash-soft maple	545.9	-	1.7	22.9	48.9	108.0	187.1	92.2	54.9	30.2
Maple-beech-birch	2,130.3	-	-	33.6	133.6	371.4	622.6	622.8	282.6	63.7
Aspen	1,415.8	-	-	12.7	39.3	197.3	422.0	398.7	260.0	85.8
Paper birch	106.8	-	-	3.8	10.3	38.0	26.1	20.5	8.1	-
Balsam poplar	54.4	-	-	3.7	8.5	11.1	6.6	18.3	4.1	2.1
Nonstocked	16.9	-	-	6.4	1.0	-	6.1	1.2	2.2	-
All forest types	7,216.9	8.7	81.7	401.2	872.8	1,503.2	1,863.3	1,546.3	741.6	198.1

(Table 37 continued on next page)

(Table 37 continued)

Forest Survey Unit and forest type	All classes	Site-index class (height in feet of dominant and codominant site trees at 50 years of age) 11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91+
Southern Lower Peninsula										
Jack pine	43.2	-	-	-	4.6	7.8	13.5	10.6	2.7	4.0
Red pine	49.4	-	-	-	3.4	13.2	7.3	14.7	10.8	-
White pine	23.6	-	-	-	-	0.6	11.6	6.7	4.7	-
White spruce	8.6	-	-	-	-	-	1.1	7.5	-	-
Northern white-cedar	6.0	-	3.0	-	-	3.0	-	-	-	-
Tamarack	7.8	-	-	-	0.7	4.1	-	-	3.0	-
Oak-hickory	746.4	-	-	6.6	19.0	97.3	207.4	209.8	163.3	43.0
Elm-ash-soft maple	671.3	-	-	5.9	16.1	55.7	124.5	176.8	201.0	91.3
Maple-beech-birch	1,300.9	-	-	3.8	14.7	76.3	228.8	384.6	397.1	195.6
Aspen	123.0	-	-	-	-	9.8	43.5	34.0	25.2	10.5
Paper birch	7.0	-	-	-	-	-	5.3	1.7	-	-
Balsam poplar	6.9	-	-	-	-	-	2.9	1.1	2.9	-
Nonstocked	6.6	-	-	-	6.6	-	-	-	-	-
All forest types	3,000.7	-	3.0	16.3	65.1	267.8	645.9	847.5	810.7	344.4
All units										
Jack pine	846.1	-	-	104.0	280.8	252.8	139.2	54.0	9.8	5.5
Red pine	897.2	-	-	16.2	95.3	211.5	261.7	248.6	63.9	-
White pine	233.8	-	-	10.4	59.3	77.2	44.1	28.5	14.3	-
Balsam fir	563.1	1.3	4.3	74.6	134.0	168.4	116.8	55.7	8.0	-
White spruce	146.9	-	2.4	11.2	27.0	38.9	40.8	20.8	3.9	1.9
Black spruce	465.1	3.5	39.8	123.8	173.9	95.3	19.1	6.1	3.6	-
Northern white-cedar	1,349.4	43.9	380.1	406.3	278.7	164.3	57.6	16.8	1.7	-
Tamarack	148.9	-	13.4	38.4	48.1	28.6	10.8	6.6	3.0	-
Oak-hickory	1,981.8	-	-	51.9	228.8	488.6	527.1	396.1	232.5	56.8
Elm-ash-soft maple	1,626.9	-	16.0	71.2	158.9	292.2	402.8	300.4	263.9	121.5
Maple-beech-birch	7,161.3	-	9.0	91.0	476.4	1,438.7	2,214.0	1,785.8	863.4	283.0
Aspen	2,675.7	-	0.8	44.8	109.7	433.6	777.4	749.9	436.0	123.5
Paper birch	291.5	-	-	11.6	29.1	95.5	100.1	41.7	11.7	1.8
Balsam poplar	189.7	-	-	8.3	27.9	34.2	56.1	45.8	15.3	2.1
Nonstocked	38.5	1.2	-	7.5	10.5	4.2	11.7	1.2	2.2	-
All forest types	18,615.9	49.9	465.8	1,071.2	2,138.4	3,824.0	4,779.3	3,758.0	1,933.2	596.1

Table 38. -- Area of timberland by forest type, basal-area class, and stand-size class, Michigan, 1993

(In thousand acres)

Forest type and stand-size class	All classes	Basal-area class (square feet per acre)													
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Jack pine															
Sawtimber	258.0	-	-	2.5	8.2	22.1	37.8	36.2	27.7	30.5	28.5	25.6	26.9	6.1	5.9
Poletimber	349.6	-	5.2	2.5	13.1	23.4	29.8	51.1	43.3	37.8	39.2	49.9	43.9	7.1	3.3
Sapling and seedling	238.5	60.7	37.6	33.2	27.2	27.8	12.0	13.7	16.2	7.2	1.1	1.8	-	-	-
All stands	846.1	60.7	42.8	38.2	48.5	73.3	79.6	101.0	87.2	75.5	68.8	77.3	70.8	13.2	9.2
Red pine															
Sawtimber	430.7	-	3.9	-	3.6	2.4	27.2	8.6	18.6	34.9	19.9	98.7	97.2	72.4	43.3
Poletimber	344.0	-	1.3	2.5	0.4	12.0	10.4	14.6	32.0	18.7	33.8	44.8	53.4	59.9	60.2
Sapling and seedling	122.5	34.2	16.2	8.5	27.1	7.8	7.2	-	11.5	1.3	2.4	2.1	2.7	1.5	-
All stands	897.2	34.2	21.4	11.0	31.1	22.2	44.8	23.2	62.1	54.9	56.1	145.6	153.3	133.8	103.5
White pine															
Sawtimber	173.8	-	-	0.6	-	3.1	3.5	18.0	7.6	17.3	20.8	35.9	34.2	19.7	13.1
Poletimber	30.5	-	-	-	1.1	1.3	1.3	8.2	1.2	3.1	2.3	5.3	5.6	1.1	-
Sapling and seedling	29.5	2.8	4.4	0.6	6.8	6.1	1.2	0.9	5.8	0.9	-	-	-	-	-
All stands	233.8	2.8	4.4	1.2	7.9	10.5	6.0	27.1	14.6	21.3	23.1	41.2	39.8	20.8	13.1
Balsam fir															
Sawtimber	177.3	-	-	3.4	-	2.8	7.1	9.8	8.3	20.4	14.9	29.9	49.8	23.9	7.0
Poletimber	158.2	-	-	-	-	4.4	3.4	6.8	12.8	16.8	24.7	27.4	41.9	12.8	7.2
Sapling and seedling	227.6	25.2	17.3	11.7	17.4	29.3	18.8	31.6	33.9	15.1	11.6	10.0	4.5	1.2	-
All stands	563.1	25.2	17.3	15.1	17.4	36.5	29.3	48.2	55.0	52.3	51.2	67.3	96.2	37.9	14.2
White spruce															
Sawtimber	47.1	-	-	-	-	-	2.9	6.7	1.0	3.9	10.0	8.8	9.4	4.4	-
Poletimber	48.9	-	-	-	3.9	-	-	-	16.4	3.1	2.9	3.7	14.4	4.5	-
Sapling and seedling	50.9	6.1	4.7	4.5	3.8	9.1	0.8	-	10.3	2.6	-	7.7	1.3	-	-
All stands	146.9	6.1	4.7	4.5	7.7	9.1	3.7	6.7	27.7	9.6	12.9	20.2	25.1	8.9	-
Black spruce															
Sawtimber	49.5	-	-	-	1.2	3.0	3.5	8.6	2.7	8.5	3.6	7.6	10.8	-	-
Poletimber	141.1	-	1.1	2.0	-	3.8	7.1	14.9	12.1	19.1	24.6	35.7	15.0	1.4	4.3
Sapling and seedling	274.5	19.3	19.8	25.4	25.3	44.6	41.6	34.2	18.3	15.2	15.5	15.3	-	-	-
All stands	465.1	19.3	20.9	27.4	26.5	51.4	52.2	57.7	33.1	42.8	43.7	58.6	25.8	1.4	4.3
Northern white-cedar															
Sawtimber	594.8	-	1.3	1.5	6.9	5.2	8.7	10.3	16.0	26.7	22.7	91.0	155.6	127.4	121.5
Poletimber	582.2	-	-	-	1.1	4.5	6.2	13.0	8.4	19.9	13.8	57.2	147.4	141.3	169.4
Sapling and seedling	172.4	5.3	3.7	4.6	12.3	13.1	7.9	14.1	10.2	11.8	10.1	24.1	38.3	14.1	2.8
All stands	1,349.4	5.3	5.0	6.1	20.3	22.8	22.8	37.4	34.6	58.4	46.6	172.3	341.3	282.8	293.7
Tamarack															
Sawtimber	31.5	-	6.0	0.6	-	3.7	4.1	3.6	5.1	1.1	-	4.7	-	-	2.6
Poletimber	40.2	-	-	-	0.7	6.5	5.8	1.0	4.3	6.0	3.6	3.9	8.4	-	-
Sapling and seedling	77.2	5.0	15.5	8.8	13.5	5.4	8.0	5.1	3.9	5.2	-	5.6	1.2	-	-
All stands	148.9	5.0	21.5	9.4	14.2	15.6	17.9	9.7	13.3	12.3	3.6	14.2	9.6	-	2.6

(Table 38 continued on next page)

(Table 38 continued)

Forest type and stand-size class	All classes	Basal-area class (square feet per acre)													
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Oak-hickory															
Sawtimber	1,230.0	4.1	-	8.6	9.4	25.9	43.5	93.3	134.9	146.4	128.9	326.0	211.8	90.8	6.4
Poletimber	457.1	-	0.5	3.2	4.4	12.6	22.5	54.4	56.7	50.6	66.8	106.6	54.7	22.1	2.0
Sapling and seedling	294.7	36.3	49.6	35.1	27.7	35.7	52.6	24.6	14.1	4.6	13.2	1.2	-	-	-
All stands	1,981.8	40.4	50.1	46.9	41.5	74.2	118.6	172.3	205.7	201.6	208.9	433.8	266.5	112.9	8.4
Elm-ash-soft maple															
Sawtimber	756.5	-	-	21.6	23.7	58.4	26.0	30.9	54.7	52.6	64.8	162.2	158.1	77.0	26.5
Poletimber	469.8	-	7.7	28.2	7.5	17.0	39.5	40.9	41.0	41.6	32.6	96.5	78.3	30.9	8.1
Sapling and seedling	400.6	21.6	40.3	48.3	84.2	39.2	39.5	49.5	17.4	28.1	18.6	6.7	7.2	-	-
All stands	1,626.9	21.6	48.0	98.1	115.4	114.6	105.0	121.3	113.1	122.3	116.0	265.4	243.6	107.9	34.6
Maple-beech-birch															
Sawtimber	3,848.4	-	4.4	4.3	16.8	47.0	90.9	116.6	202.1	293.4	330.0	791.4	1,197.8	586.5	167.2
Poletimber	1,979.2	-	4.3	6.7	29.0	26.6	61.5	61.5	121.4	160.6	248.1	392.6	541.1	266.2	59.6
Sapling and seedling	1,333.7	131.1	146.3	132.7	132.7	180.4	138.8	177.9	123.7	74.2	63.3	30.1	2.5	-	-
All stands	7,161.3	131.1	155.0	143.7	178.5	254.0	291.2	356.0	447.2	528.2	641.4	1,214.1	1,741.4	852.7	226.8
Aspen															
Sawtimber	850.7	-	1.4	-	4.0	11.1	28.0	62.7	83.4	72.1	107.9	166.7	185.9	91.6	35.9
Poletimber	720.6	-	-	9.1	13.2	48.1	20.1	53.1	65.1	63.4	81.3	145.2	134.1	71.4	16.5
Sapling and seedling	1,104.4	139.3	114.3	125.9	128.6	141.5	137.5	119.2	60.9	64.6	29.4	40.0	3.2	-	-
All stands	2,675.7	139.3	115.7	135.0	145.8	200.7	185.6	235.0	209.4	200.1	218.6	351.9	323.2	163.0	52.4
Paper birch															
Sawtimber	90.4	-	-	-	-	3.5	-	8.2	3.7	5.5	9.1	18.4	29.7	10.0	2.3
Poletimber	166.8	-	-	-	1.2	1.0	9.3	4.9	6.2	5.9	17.3	36.7	51.8	26.0	6.5
Sapling and seedling	34.3	13.0	5.9	-	7.7	-	2.3	1.2	1.1	0.8	2.3	-	-	-	-
All stands	291.5	13.0	5.9	-	8.9	4.5	11.6	14.3	11.0	12.2	28.7	55.1	81.5	36.0	8.8
Balsam poplar															
Sawtimber	66.2	-	-	1.4	-	4.7	6.2	8.4	-	2.6	4.3	12.4	20.1	4.9	1.2
Poletimber	53.1	-	-	-	4.0	1.2	2.2	9.7	-	8.1	2.4	15.8	4.7	3.6	1.4
Sapling and seedling	70.4	14.8	12.6	6.3	11.4	14.0	4.2	3.0	4.1	-	-	-	-	-	-
All stands	189.7	14.8	12.6	7.7	15.4	19.9	12.6	21.1	4.1	10.7	6.7	28.2	24.8	8.5	2.6
Nonstocked	38.5	36.4	2.1	-	-	-	-	-	-	-	-	-	-	-	-
All forest types															
Sawtimber	8,604.9	4.1	17.0	44.5	73.8	192.9	289.4	421.9	565.8	715.9	765.4	1,779.3	2,187.3	1,114.7	432.9
Poletimber	5,541.3	-	20.1	54.2	79.6	162.4	219.1	334.1	420.9	454.7	593.4	1,021.3	1,194.7	648.3	338.5
Sapling and seedling	4,431.2	514.7	488.2	445.6	525.7	554.0	472.4	475.0	331.4	231.6	167.5	144.6	60.9	16.8	2.8
Nonstocked	38.5	36.4	2.1	-	-	-	-	-	-	-	-	-	-	-	-
All stands	18,615.9	555.2	527.4	544.3	679.1	909.3	980.9	1,231.0	1,318.1	1,402.2	1,526.3	2,945.2	3,442.9	1,779.8	774.2

Table 39. -- Area of timberland by stocking class based on selected stand components and Forest Survey Unit, Michigan, 1993

(In thousand acres)

Stocking class (percent)	Stocking classified in terms of:			
	All live trees	Growing-stock trees	Rough trees	Rotten trees
Eastern Upper Peninsula				
0-10	3.5	7.3	2,385.8	3,267.1
11-20	8.7	9.3	795.1	383.0
21-30	8.5	19.2	381.6	97.4
31-40	27.2	34.2	145.4	41.8
41-50	15.7	24.9	50.3	14.6
51-60	37.9	55.3	19.3	5.0
61-70	46.6	84.5	14.8	-
71-80	51.0	107.8	11.8	-
81-90	84.2	199.6	-	-
91-100	105.5	271.0	1.2	-
101-110	164.9	427.2	2.5	-
111-120	372.8	566.3	-	-
121-130	563.8	584.6	-	-
131-140	681.7	536.5	1.1	-
141-150	574.6	424.6	-	-
151-160	456.0	323.1	-	-
161+	606.3	133.5	-	-
All classes	3,808.9	3,808.9	3,808.9	3,808.9
Western Upper Peninsula				
0-10	3.3	13.3	2,395.4	3,672.8
11-20	5.0	10.3	1,169.4	622.8
21-30	7.2	16.7	516.5	200.6
31-40	7.1	35.2	292.5	64.6
41-50	17.8	38.7	116.8	21.2
51-60	24.5	59.2	50.1	6.2
61-70	34.2	67.7	13.7	1.2
71-80	42.4	120.9	12.4	-
81-90	48.1	208.0	12.8	-
91-100	64.0	343.8	4.9	-
101-110	159.9	509.7	1.6	-
111-120	346.3	684.9	1.7	-
121-130	639.3	781.9	1.6	-
131-140	901.9	738.7	-	-
141-150	911.6	513.8	-	-
151-160	625.7	311.4	-	-
161+	751.1	135.2	-	-
All classes	4,589.4	4,589.4	4,589.4	4,589.4
Northern Lower Peninsula				
0-10	8.4	25.4	5,036.2	6,705.7
11-20	15.6	45.2	1,359.9	411.1
21-30	46.7	95.9	516.7	78.3
31-40	97.0	101.1	176.1	16.9
41-50	73.7	117.0	53.0	1.8
51-60	109.9	164.8	42.7	1.2
61-70	134.9	196.3	9.6	-
71-80	167.5	267.1	14.4	1.9
81-90	228.8	461.9	4.3	-
91-100	379.2	653.6	4.0	-
101-110	632.1	986.1	-	-
111-120	1,137.5	1,299.8	-	-
121-130	1,405.0	1,177.1	-	-
131-140	1,361.8	948.8	-	-
141-150	996.1	478.8	-	-
151-160	349.3	164.4	-	-
161+	73.4	33.6	-	-
All classes	7,216.9	7,216.9	7,216.9	7,216.9

(Table 39 continued on next page)

(Table 39 continued)

Stocking class (percent)	Stocking classified in terms of: All live trees	Growing-stock trees	Rough trees	Rotten trees
Southern Lower Peninsula				
0-10	6.6	33.0	1,618.2	2,858.2
11-20	7.8	37.6	736.0	120.2
21-30	33.0	64.6	339.3	17.4
31-40	36.0	54.0	188.4	-
41-50	33.0	123.4	60.0	-
51-60	94.3	118.0	29.2	4.9
61-70	69.4	113.4	17.9	-
71-80	141.8	193.6	2.7	-
81-90	124.5	238.0	2.6	-
91-100	219.0	314.0	-	-
101-110	289.0	425.3	3.4	-
111-120	436.0	449.4	-	-
121-130	619.8	403.8	-	-
131-140	501.3	281.3	3.0	-
141-150	302.8	110.5	-	-
151-160	72.3	37.3	-	-
161+	14.1	3.5	-	-
All classes	3,000.7	3,000.7	3,000.7	3,000.7
All Units				
0-10	21.8	79.0	11,435.6	16,503.8
11-20	37.1	102.4	4,060.4	1,537.1
21-30	95.4	196.4	1,754.1	393.7
31-40	167.3	224.5	802.4	123.3
41-50	140.2	304.0	280.1	37.6
51-60	266.6	397.3	141.3	17.3
61-70	285.1	461.9	56.0	1.2
71-80	402.7	689.4	41.3	1.9
81-90	485.6	1,107.5	19.7	-
91-100	767.7	1,582.4	10.1	-
101-110	1,245.9	2,348.3	7.5	-
111-120	2,292.6	3,000.4	1.7	-
121-130	3,227.9	2,947.4	1.6	-
131-140	3,446.7	2,505.3	4.1	-
141-150	2,785.1	1,527.7	-	-
151-160	1,503.3	836.2	-	-
161+	1,444.9	305.8	-	-
All classes	18,615.9	18,615.9	18,615.9	18,615.9

Table 40. -- Area of timberland in plantations by forest type, stand-age class, and Forest Survey Unit, Michigan, 1993

(In thousand acres)

Forest Survey Unit and forest type	All classes	Stand-age class (years) 1-10	11-20	21-30	31-40	41-50	51-60	61-70	71+
Eastern Upper Peninsula									
Jack pine	50.4	1.8	8.0	4.9	9.6	10.5	12.6	3.0	-
Red pine	110.0	5.5	20.6	9.1	22.3	32.3	14.3	4.1	1.8
White pine	3.9	-	0.9	-	-	-	3.0	-	-
Balsam fir	1.9	-	-	-	1.9	-	-	-	-
White spruce	11.8	-	4.2	7.6	-	-	-	-	-
Black spruce	1.4	-	-	-	1.4	-	-	-	-
Tamarack	1.2	1.2	-	-	-	-	-	-	-
All types	180.6	8.5	33.7	21.6	35.2	42.8	29.9	7.1	1.8
Western Upper Peninsula									
Jack pine	31.7	10.4	3.5	2.9	-	6.1	7.0	1.8	-
Red pine	55.3	16.1	11.4	4.3	10.9	10.3	1.2	1.1	-
Balsam fir	4.6	-	-	-	-	4.6	-	-	-
White spruce	10.2	-	0.9	3.8	3.1	1.3	1.1	-	-
Black spruce	5.6	-	2.2	3.4	-	-	-	-	-
All types	107.4	26.5	18.0	14.4	14.0	22.3	9.3	2.9	-
Northern Lower Peninsula									
Jack pine	165.0	30.2	32.1	23.7	51.5	14.5	13.0	-	-
Red pine	428.0	14.7	52.9	116.4	133.5	53.8	51.3	5.4	-
White pine	16.1	1.2	0.5	1.9	6.4	6.1	-	-	-
White spruce	11.3	2.1	0.6	8.6	-	-	-	-	-
Black spruce	3.6	-	3.6	-	-	-	-	-	-
All types	624.0	48.2	89.7	150.6	191.4	74.4	64.3	5.4	-
Southern Lower Peninsula									
Jack pine	21.7	0.2	1.1	9.7	4.2	-	6.5	-	-
Red pine	29.7	-	-	4.8	12.9	9.4	-	2.6	-
White pine	18.3	2.8	0.9	10.0	2.7	-	1.9	-	-
White spruce	4.8	-	3.7	-	1.1	-	-	-	-
Elm-ash-soft maple	0.5	-	-	-	-	0.5	-	-	-
All types	75.0	3.0	5.7	24.5	20.9	9.9	8.4	2.6	-
All units									
Jack pine	268.8	42.6	44.7	41.2	65.3	31.1	39.1	4.8	-
Red pine	623.0	36.3	84.9	134.6	179.6	105.8	66.8	13.2	1.8
White pine	38.3	4.0	2.3	11.9	9.1	6.1	4.9	-	-
Balsam fir	6.5	-	-	-	1.9	4.6	-	-	-
White spruce	38.1	2.1	9.4	20.0	4.2	1.3	1.1	-	-
Black spruce	10.6	-	5.8	3.4	1.4	-	-	-	-
Tamarack	1.2	1.2	-	-	-	-	-	-	-
Elm-ash-soft maple	0.5	-	-	-	-	0.5	-	-	-
All types	987.0	86.2	147.1	211.1	261.5	149.4	111.9	18.0	1.8

Table 41. -- Area of reserved forest land by ownership class and Forest Survey Unit, Michigan, 1993

(In thousand acres)

Ownership class	All Units	Forest Survey Unit			
		Eastern Upper Peninsula	Western Upper Peninsula	Northern Lower Peninsula	Southern Lower Peninsula
National forest	129.6	46.1	49.3	34.2	-
Other federal	200.6	43.1	111.3	46.2	-
State	182.1	29.2	67.5	38.4	47.0
County and municipal	7.4	0.2	0.5	1.1	5.6
Individual	50.1	2.3	-	47.8	-
Corporate	4.9	-	1.0	3.5	0.4
All ownerships	574.7	120.9	229.6	171.2	53.0

Table 42. -- Area of reserved forest land by forest type and Forest Survey Unit, Michigan, 1993

(In thousand acres)

Forest type	All Units	Forest Survey Unit			
		Eastern Upper Peninsula	Western Upper Peninsula	Northern Lower Peninsula	Southern Lower Peninsula
Jack pine	38.4	9.9	-	28.5	-
Red pine	21.3	3.6	2.0	14.8	0.9
White pine	1.0	-	-	1.0	-
Balsam fir	32.1	2.0	28.8	1.3	-
White spruce	30.8	0.9	1.8	28.1	-
Black spruce	7.5	7.3	-	0.2	-
Northern white-cedar	29.4	16.7	6.5	6.2	-
Tamarack	2.5	-	1.0	1.5	-
Oak-hickory	29.9	-	-	13.1	16.8
Elm-ash-soft maple	60.2	10.0	9.1	16.1	25.0
Maple-beech-birch	190.1	59.6	82.6	43.6	4.3
Aspen	121.0	5.4	95.4	15.9	4.3
Paper birch	10.5	5.5	2.4	0.9	1.7
All types	574.7	120.9	229.6	171.2	53.0

Table 43. – Net volume of growing stock on timberland by species group and Forest Survey Unit, Michigan, 1980 and 1993

(In thousand cubic feet)

Species group	All Units		Forest Survey Unit							
			Eastern Upper Peninsula		Western Upper Peninsula		Northern Lower Peninsula		Southern Lower Peninsula	
	1980	1993	1980	1993	1980	1993	1980	1993	1980	1993
Softwoods										
Jack pine	624,215	603,319	175,108	187,212	102,205	101,568	334,294	300,913	12,608	13,626
Red pine	762,797	1,626,692	141,845	272,909	89,208	151,509	482,286	1,117,260	49,458	85,014
White pine	598,571	869,620	167,032	225,202	168,765	210,997	187,016	329,737	75,758	103,684
White spruce	387,650	494,221	143,132	158,226	204,022	266,938	38,312	58,716	2,184	10,341
Black spruce	342,903	365,055	144,989	155,240	157,688	169,269	40,226	40,546	-	-
Balsam fir	789,198	822,551	262,214	279,011	411,993	410,376	114,793	132,740	198	424
Hemlock	561,216	661,724	152,248	170,483	337,123	383,390	65,659	99,544	6,186	8,307
Tamarack	112,852	180,922	42,703	60,180	36,570	63,013	29,413	44,426	4,166	13,303
Eastern redcedar	685	2,931	-	-	-	-	-	1,151	685	1,780
Northern white-cedar	1,410,226	1,832,717	580,681	762,974	369,850	467,187	455,776	593,756	3,919	8,800
Other softwoods	57,787	112,318	1,539	4,429	496	1,892	29,410	74,547	26,342	31,450
Total softwoods	5,648,100	7,572,070	1,811,491	2,275,866	1,877,920	2,226,139	1,777,185	2,793,336	181,504	276,729
Hardwoods										
Select white oak	572,821	819,566	324	754	1,486	635	237,521	355,389	333,490	462,788
Other white oak	-	644	-	-	-	-	-	644	-	-
Select red oak	1,134,771	1,604,647	26,052	34,900	88,665	112,670	705,317	1,008,474	314,737	448,603
Other red oak	281,592	397,604	-	-	-	42	139,721	189,967	141,871	207,595
Select hickory	64,054	92,659	-	-	-	-	641	1,671	63,413	90,988
Other hickory	50,823	65,120	-	342	-	-	1,281	1,885	49,542	62,893
Basswood	699,404	903,635	49,041	66,110	217,001	284,911	339,494	418,790	93,868	133,824
Beech	353,582	477,377	175,532	203,479	469	895	126,919	201,793	50,662	71,210
Yellow birch	520,454	498,381	120,227	103,819	354,362	330,144	37,218	53,777	8,647	10,641
Hard maple	2,817,888	4,042,740	523,469	748,882	1,488,059	1,977,225	680,408	1,108,029	125,952	208,604
Soft maple	2,350,443	3,452,234	489,701	636,301	663,209	841,133	778,034	1,235,586	419,499	739,214
Elm	274,752	282,103	32,823	9,348	150,000	37,925	31,482	40,773	60,447	194,057
Black ash	249,545	338,088	45,431	64,006	100,975	116,285	75,744	101,668	27,395	56,129
White and green ash	440,093	814,075	21,200	39,231	30,998	51,109	183,004	302,001	204,891	421,734
Sycamore	16,387	23,004	-	-	-	-	545	1,221	15,842	21,783
Cottonwood	67,063	131,894	368	573	-	-	11,103	18,615	55,592	112,706
Willow	31,767	43,316	122	110	-	429	6,557	8,413	25,088	34,364
Hackberry	985	4,628	-	-	-	-	-	-	985	4,628
Balsam poplar	309,070	345,096	133,898	144,938	56,767	63,390	108,213	127,846	10,192	8,922
Bigtooth aspen	971,278	1,236,719	67,471	72,775	111,318	133,084	709,429	908,510	83,060	122,350
Quaking aspen	1,650,381	1,971,082	318,263	396,061	626,118	669,192	631,228	799,682	74,772	106,147
Paper birch	802,947	844,859	249,392	252,697	265,279	270,297	267,498	297,999	20,778	23,866
Tupelo	2,727	6,192	-	-	-	-	785	1,130	1,942	5,062
Black cherry	342,405	496,151	49,805	52,934	60,487	68,171	98,122	136,986	133,991	238,060
Black walnut	33,536	54,445	-	-	-	-	452	849	33,084	53,596
Butternut	5,816	8,718	-	540	-	-	573	489	5,243	7,689
Yellow-poplar	20,119	38,756	-	-	-	-	-	-	20,119	38,756
Sassafras	26,478	48,629	-	-	-	-	1,471	3,215	25,007	45,414
Other hardwoods	10,490	30,453	194	322	377	489	1,094	2,988	8,825	26,654
Total hardwoods	14,101,671	19,072,815	2,303,313	2,828,122	4,215,570	4,958,026	5,173,854	7,328,390	2,408,934	3,958,277
All species	19,749,771	26,644,885	4,114,804	5,103,988	6,093,490	7,184,165	6,951,039	10,121,726	2,590,438	4,235,006

Table 44. -- Net volume of sawtimber on timberland by species group and Forest Survey Unit, Michigan, 1980 and 1993

(In thousand board feet)[1]

	All Units		Forest Survey Unit							
			Eastern Upper Peninsula		Western Upper Peninsula		Northern Lower Peninsula		Southern Lower Peninsula	
Species group	1980	1993	1980	1993	1980	1993	1980	1993	1980	1993
Softwoods										
Jack pine	1,218,263	1,474,600	314,403	445,135	287,854	342,139	585,972	653,770	30,034	33,556
Red pine	1,953,674	4,791,938	431,403	1,110,683	280,225	566,657	1,132,347	2,828,944	109,699	285,654
White pine	2,752,769	3,973,439	794,678	1,070,749	822,114	1,068,936	834,893	1,396,576	301,084	437,178
White spruce	1,407,276	1,950,136	482,973	615,977	789,811	1,122,092	133,484	187,725	1,008	24,342
Black spruce	391,022	508,901	155,582	190,646	182,111	253,541	53,329	64,714	-	-
Balsam fir	1,149,768	1,481,028	332,789	457,685	653,043	772,432	163,017	248,908	919	2,003
Hemlock	2,590,636	3,154,012	681,186	795,256	1,622,658	1,908,724	258,146	409,481	28,646	40,551
Tamarack	214,876	430,682	75,214	115,412	73,732	158,854	58,791	120,545	7,139	35,871
Eastern redcedar	1,404	4,877	-	-	-	-	-	2,666	1,404	2,211
Northern white-cedar	3,286,387	4,696,896	1,210,788	1,823,049	1,247,261	1,605,852	822,991	1,250,687	5,347	17,308
Other softwoods	69,079	226,052	1,944	15,212	-	3,679	10,332	110,789	56,803	96,372
Total softwoods	15,035,154	22,692,561	4,480,960	6,639,804	5,958,809	7,802,906	4,053,302	7,274,805	542,083	975,046
Hardwoods										
Select white oak	1,644,156	2,659,883	475	2,354	6,187	2,739	487,560	907,489	1,149,934	1,747,301
Select red oak	3,219,102	5,513,432	55,913	103,325	265,663	371,090	1,788,435	3,289,938	1,109,091	1,749,079
Other red oak	779,793	1,320,026	-	-	-	-	324,931	579,186	454,862	740,840
Select hickory	158,676	271,408	-	-	-	-	627	3,145	158,049	268,263
Other hickory	124,278	178,167	-	1,138	-	-	3,345	3,229	120,933	173,800
Basswood	1,558,535	2,504,525	104,618	178,562	456,734	780,922	718,575	1,148,903	278,608	396,138
Beech	1,190,303	1,676,951	603,354	736,242	745	1,124	387,349	632,167	198,855	307,418
Yellow birch	1,577,031	1,473,171	412,795	341,800	1,073,396	983,766	69,679	118,263	21,161	29,342
Hard maple	6,234,704	9,282,920	1,158,761	1,705,093	3,558,811	4,685,546	1,099,902	2,192,548	417,230	699,733
Soft maple	4,502,929	7,708,538	902,741	1,263,087	1,101,197	1,560,360	1,296,420	2,620,902	1,202,572	2,264,189
Elm	526,028	431,468	79,205	20,731	357,221	115,494	36,296	47,149	53,306	248,094
Black ash	317,160	475,217	39,321	60,825	179,183	201,125	60,851	94,748	37,805	118,519
White and green ash	1,033,479	2,214,657	37,141	96,002	65,679	123,980	395,398	830,289	535,261	1,164,386
Sycamore	70,556	107,688	-	-	-	-	2,719	6,243	67,837	101,445
Cottonwood	228,738	520,161	1,506	2,442	-	-	39,005	70,003	188,227	447,716
Willow	116,196	157,770	508	485	-	1,856	22,769	30,990	92,919	124,439
Hackberry	2,581	7,544	-	-	-	-	-	-	2,581	7,544
Balsam poplar	791,288	977,493	298,740	371,222	153,042	183,199	315,161	393,608	24,345	29,464
Bigtooth aspen	1,770,435	3,293,765	101,708	187,674	236,631	433,431	1,298,284	2,396,019	133,811	276,641
Quaking aspen	2,965,374	4,736,558	493,733	906,866	1,209,762	1,819,235	1,181,446	1,882,083	80,433	128,374
Paper birch	869,234	1,209,190	290,892	354,886	345,000	450,175	218,790	379,474	14,552	24,655
Tupelo	5,871	11,271	-	-	-	-	602	1,886	5,269	9,385
Black cherry	595,142	1,087,087	69,786	123,830	60,757	106,161	170,999	303,039	293,600	554,057
Black walnut	98,058	160,994	-	-	-	-	1,237	3,703	96,821	157,291
Butternut	16,754	27,239	-	2,543	-	-	2,708	1,706	14,046	22,990
Yellow-poplar	80,815	162,735	-	-	-	-	-	-	80,815	162,735
Sassafras	27,536	69,742	-	-	-	-	3,378	10,423	24,158	59,319
Other hardwoods	9,117	39,053	501	546	790	-	689	-	7,137	38,507
Total hardwoods	30,513,869	48,278,653	4,651,698	6,459,653	9,070,798	11,820,203	9,927,155	17,947,133	6,864,218	12,051,664
All species	45,549,023	70,971,214	9,132,658	13,099,457	15,029,607	19,623,109	13,980,457	25,221,938	7,406,301	13,026,710

[1]International1/4-inch rule.

Table 45. -- Net volume of all live trees[1] on timberland by species group and diameter class, Michigan, 1993

(In thousand cubic feet)

Species group	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods											
Jack pine	641,910	123,148	194,861	163,598	101,610	37,088	15,563	5,051	691	300	-
Red pine	1,651,454	272,966	451,702	328,292	221,267	141,395	89,426	65,433	41,323	39,490	160
White pine	923,573	54,281	65,371	90,811	97,784	91,280	91,304	92,640	82,504	210,847	46,751
White spruce	502,629	49,933	83,213	86,159	92,158	72,659	51,598	36,876	15,348	14,074	611
Black spruce	371,092	154,799	119,129	55,812	24,587	7,927	3,889	3,641	1,045	263	-
Balsam fir	837,186	266,374	259,035	185,107	75,938	34,698	10,496	4,001	618	919	-
Hemlock	717,756	24,508	40,092	72,399	93,417	106,479	114,784	87,227	61,509	105,765	11,576
Tamarack	193,704	52,116	51,345	38,311	25,667	13,309	7,319	3,396	1,104	749	388
Eastern redcedar	3,191	1,169	849	626	273	126	-	-	-	148	-
Northern white-cedar	2,099,637	459,111	539,766	432,983	283,565	182,077	95,616	54,850	26,750	23,647	1,272
Other softwoods	130,416	32,644	42,462	33,364	14,306	4,035	2,895	-	710	-	-
Total softwoods	8,072,548	1,491,049	1,847,825	1,487,462	1,030,572	691,073	482,890	353,115	231,602	396,202	60,758
Hardwoods											
Select white oak	901,191	58,511	81,322	113,772	106,670	113,030	100,256	87,996	61,998	128,232	49,404
Other white oak	1,030	71	178	781	-	-	-	-	-	-	-
Select red oak	1,722,858	70,968	131,159	217,527	264,112	264,505	202,094	165,568	137,569	227,554	41,802
Other red oak	437,471	25,376	37,537	57,577	61,750	58,689	62,242	44,746	34,658	42,989	11,907
Select hickory	97,902	4,681	7,904	15,299	17,745	19,513	13,460	8,319	4,640	6,099	242
Other hickory	68,088	4,480	7,246	10,402	15,229	11,044	7,392	6,913	2,854	2,528	-
Basswood	954,390	56,847	129,841	182,116	206,077	145,045	98,840	58,379	33,427	39,684	4,134
Beech	577,168	39,151	50,753	67,427	66,023	71,237	79,804	64,242	44,143	84,514	9,874
Yellow birch	641,782	61,602	79,724	94,595	87,849	80,204	78,603	55,116	35,173	61,156	7,760
Hard maple	4,430,789	606,112	752,254	787,540	652,777	485,602	391,919	290,927	179,264	248,892	35,502
Soft maple	3,851,515	489,584	674,759	709,609	581,506	434,999	326,067	223,611	133,671	215,049	62,660
Elm	314,444	58,908	66,457	68,883	46,054	28,844	20,376	11,233	4,502	8,984	203
Black ash	370,072	100,843	93,871	64,655	45,150	34,577	15,672	8,130	3,484	3,690	-
White and green ash	859,970	86,040	126,447	129,638	128,647	115,114	98,422	71,543	36,954	55,391	11,774
Sycamore	24,108	396	149	1,678	2,191	1,822	712	3,428	754	8,157	4,821
Cottonwood	135,725	3,398	6,066	8,482	12,418	15,086	19,449	15,943	9,855	27,758	17,270
Willow	63,071	2,655	3,638	4,881	5,821	5,704	9,370	4,774	5,632	14,113	6,483
Hackberry	4,628	1,647	788	492	177	342	354	828	-	-	-
Balsam poplar	362,014	31,907	42,900	65,001	53,847	51,342	41,599	27,575	19,115	27,029	1,699
Bigtooth aspen	1,302,513	104,457	173,615	254,039	283,797	235,520	129,371	64,363	32,140	24,463	748
Quaking aspen	2,180,606	242,274	326,209	424,998	422,012	313,236	222,161	129,760	50,198	48,820	938
Paper birch	930,559	156,295	222,402	230,365	157,885	86,530	42,074	19,878	7,435	7,226	469
Tupelo	8,202	2,453	1,356	1,315	461	1,282	-	-	-	1,335	-
Black cherry	640,072	77,258	116,837	130,221	103,287	87,649	51,235	36,287	16,210	19,959	1,129
Black walnut	60,059	4,489	7,167	10,167	9,759	9,215	5,680	5,350	3,279	4,193	760
Butternut	11,060	457	1,752	1,495	2,795	1,672	1,148	528	237	976	-
Yellow-poplar	39,416	1,261	947	2,996	4,674	4,432	6,073	3,034	6,996	8,139	864
Sassafras	62,280	13,552	17,308	11,760	9,543	5,810	2,780	1,152	-	375	-
Other hardwoods	48,110	9,756	11,864	8,771	8,051	3,755	3,378	697	1,068	626	144
Noncommercial species	109,443	47,958	30,775	18,333	6,945	2,869	520	143	458	1,138	304
Total hardwoods	21,210,536	2,363,387	3,203,225	3,694,815	3,363,252	2,688,669	2,031,051	1,410,463	865,714	1,319,069	270,891
All species	29,283,084	3,854,436	5,051,050	5,182,277	4,393,824	3,379,742	2,513,941	1,763,578	1,097,316	1,715,271	331,649

[1] Net volume of all live trees 5 inches d.b.h. and larger from a 1-foot stump to a 4-inch top diameter outside bark.

Table 46. – Net volume of tree species on timberland by major tree class and individual species, Michigan, 1993

Species group	Total all live	Major tree class: All live trees: Growing stock	All live trees: Short-log	All live trees: Rough	All live trees: Rotten	Total saw-log size trees	Saw-log size trees: Sawtimber	Saw-log size trees: Short-log
Softwoods	*Thousand cubic feet*					*Thousand board feet* [1]		
Jack pine	641,910	603,319	5,699	31,561	1,331	1,493,542	1,474,600	18,942
Red pine	1,651,454	1,626,692	4,068	20,369	325	4,806,986	4,791,938	15,048
White pine	923,573	869,620	16,002	34,397	3,554	4,027,280	3,973,439	53,841
White spruce	502,629	494,221	2,027	5,838	543	1,960,150	1,950,136	10,014
Black spruce	371,092	365,055	271	5,482	284	509,760	508,901	859
Balsam fir	837,186	822,551	2,829	9,891	1,915	1,489,239	1,481,028	8,211
Hemlock	717,756	661,724	19,337	25,112	11,583	3,208,842	3,154,012	54,830
Tamarack	193,704	180,922	1,812	9,063	1,907	438,122	430,682	7,440
Eastern redcedar	3,191	2,931	161	99	-	5,604	4,877	727
Northern white-cedar	2,099,637	1,832,717	45,798	142,542	78,580	4,857,691	4,696,896	160,795
Norway spruce	6,211	6,147	-	64	-	9,899	9,899	-
Engelmann spruce	122	122	-	-	-	-	-	-
Blue spruce	1,082	1,082	-	-	-	2,001	2,001	-
Scotch pine	102,668	87,082	1,769	13,817	-	182,966	175,292	7,674
Austrian pine	19,323	16,875	-	2,448	-	38,434	38,434	-
Douglas fir	1,010	1,010	-	-	-	426	426	-
Total softwoods	8,072,548	7,572,070	99,773	300,683	100,022	23,030,942	22,692,561	338,381
Hardwoods								
White oak	797,261	726,362	26,046	41,118	3,735	2,361,849	2,296,944	64,905
Swamp white oak	69,072	63,893	1,752	3,351	76	255,242	250,980	4,262
Bur oak	33,565	28,018	2,213	3,062	272	117,702	111,959	5,743
Chinkapin oak	1,293	1,293	-	-	-	-	-	-
Chestnut oak	1,030	644	-	386	-	-	-	-
Northern red oak	1,722,858	1,604,647	43,204	65,284	9,723	5,606,054	5,513,432	92,622
Scarlet oak	2,321	2,321	-	-	-	8,488	8,488	-
Northern pin oak	76,767	70,485	1,643	4,327	312	220,349	216,718	3,631
Pin oak	7,503	7,300	-	165	38	23,688	23,688	-
Black oak	350,880	317,498	12,765	18,440	2,177	1,099,941	1,071,132	28,809
Shellbark hickory	5,355	5,355	-	-	-	20,108	20,108	-
Shagbark hickory	78,769	73,526	659	4,584	-	201,393	199,883	1,510
Mockernut hickory	13,778	13,778	-	-	-	51,417	51,417	-
Bitternut hickory	53,172	50,329	1,166	1,542	135	129,277	126,332	2,945
Pignut hickory	14,916	14,791	-	125	-	51,835	51,835	-
American basswood	954,390	903,635	12,337	27,685	10,733	2,529,268	2,504,525	24,743
Beech	577,168	477,377	24,980	42,590	32,221	1,742,687	1,676,951	65,736
Yellow birch	641,782	498,381	37,615	70,221	35,565	1,563,446	1,473,171	90,275
Black maple	1,805	1,278	-	204	323	5,643	5,643	-
Sugar maple	4,428,984	4,041,462	87,974	245,481	54,067	9,474,359	9,277,277	197,082
Red maple	3,572,549	3,194,638	90,874	230,719	56,318	7,038,240	6,807,511	230,729
Silver maple	278,966	257,596	7,521	10,435	3,414	921,493	901,027	20,466
American elm	277,940	248,644	6,024	22,359	913	404,273	389,583	14,690
Siberian elm	376	350	-	-	26	936	936	-
Slippery elm	26,586	24,809	-	1,460	317	22,846	22,846	-
Rock elm	9,542	8,300	302	529	411	18,879	18,103	776
Black ash	370,072	338,088	2,103	25,352	4,529	479,886	475,217	4,669
White ash	600,877	571,583	13,212	13,059	3,023	1,746,976	1,718,167	28,809
Green ash	259,093	242,492	5,642	9,800	1,159	508,127	496,490	11,637
Sycamore	24,108	23,004	-	1,015	89	107,688	107,688	-
Eastern cottonwood	135,725	131,894	994	2,044	793	523,468	520,161	3,307
Black willow	63,071	43,316	4,420	12,700	2,635	172,444	157,770	14,674
Hackberry	4,628	4,628	-	-	-	7,544	7,544	-
Balsam poplar	362,014	345,096	1,842	8,565	6,511	981,851	977,493	4,358
Bigtooth aspen	1,302,513	1,236,719	13,071	24,347	28,376	3,315,729	3,293,765	21,964
Quaking aspen	2,180,606	1,971,082	34,440	95,311	79,773	4,809,843	4,736,558	73,285
Paper birch	930,559	844,859	16,160	58,916	10,624	1,247,255	1,209,190	38,065
River birch	74	74	-	-	-	-	-	-
Tupelo	8,202	6,192	-	1,887	123	11,271	11,271	-
Black cherry	640,072	496,151	28,555	110,483	6,883	1,148,591	1,087,087	59,504
Black walnut	60,059	54,445	1,512	4,007	95	164,845	160,994	3,851
Butternut	11,060	8,718	581	1,120	661	28,683	27,239	1,444
Yellow-poplar	39,416	38,756	468	-	192	163,971	162,735	1,236
Boxelder	25,351	12,864	2,585	8,960	942	30,281	23,036	7,245
Ohio buckeye	377	377	-	-	-	1,671	1,671	-
Sweet birch	1,051	1,051	-	-	-	-	-	-
Flowering dogwood	2,159	1,039	-	1,057	63	-	-	-
Honeylocust	2,688	2,688	-	-	-	-	-	-
Red mulberry	1,357	124	51	1,107	75	136	-	136
Black locust	14,907	12,236	217	2,144	310	14,990	14,346	644
Sassafras	62,280	48,629	588	11,413	1,650	71,472	69,742	1,730
Noncommercial species	109,589	-	95	107,948	1,546	242	-	242
Total hardwoods	21,210,536	19,072,815	481,591	1,295,302	360,828	49,404,377	48,278,653	1,125,724
All commercial species	29,283,084	26,644,885	581,364	1,595,985	460,850	72,435,319	70,971,214	1,464,105

[1] International 1/4-inch rule.

Table 47. -- Net volume of noncommercial tree species on timberland by individual species, Michigan, 1993

(In thousand cubic feet)

Noncommercial tree species	Nongrowing-stock volume
Striped maple	2,162
Mountain maple	1,703
American hornbeam	3,183
Hawthorn	6,300
Osage-orange	240
Apple	15,172
Eastern hophornbeam	70,005
Pincherry	5,127
Chokecherry	2,791
Mountain ash	1,036
Peachleaf willow	763
Diamond willow	961
All noncommercial species	109,443

Table 48. – Net volume of growing stock on timberland by species group and forest type, Michigan, 1993

(In thousand cubic feet)

Species group	All types	Forest type														
		Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar	Tamarack	Oak-hickory	Elm-ash-soft maple	Maple-beech-birch	Aspen	Paper birch	Balsam poplar	Non-stocked
Softwoods																
Jack pine	603,319	447,032	55,412	7,219	2,286	1,620	13,693	89	258	48,512	687	9,347	14,137	2,426	-	601
Red pine	1,626,692	83,088	1,287,035	34,483	10,183	2,536	8,405	5,174	199	51,040	6,171	63,724	66,566	7,358	279	451
White pine	869,620	20,460	76,248	238,139	34,069	9,356	24,154	60,415	2,892	59,679	24,869	239,091	64,946	14,278	1,024	-
White spruce	494,221	3,648	9,290	12,586	80,240	72,953	7,939	49,661	424	4,163	21,836	128,958	83,076	12,327	7,075	45
Black spruce	365,055	6,816	3,279	7,205	33,964	4,006	166,804	83,173	8,063	-	11,248	18,788	16,073	3,804	1,832	-
Balsam fir	822,551	1,819	6,938	8,576	185,317	13,008	23,405	110,320	3,049	2,039	55,643	210,794	143,787	35,049	22,807	-
Hemlock	661,724	-	1,881	3,318	5,567	217	1,785	22,892	-	2,717	27,675	578,452	10,956	5,230	1,034	-
Tamarack	180,922	447	929	315	10,871	936	26,040	49,611	61,866	295	10,809	4,904	7,643	2,815	3,441	-
Eastern redcedar	2,931	-	-	-	-	-	-	-	-	1,648	-	1,283	-	-	-	-
Northern white-cedar	1,832,717	516	2,226	3,223	58,968	9,009	16,915	1,295,152	13,008	1,788	113,035	190,522	72,371	35,271	20,713	-
Other softwoods	112,318	77,938	8,850	254	926	1,363	150	277	-	3,303	975	17,199	920	163	-	-
Total softwoods	7,572,070	641,764	1,452,088	315,318	422,391	115,004	289,290	1,676,764	89,759	175,184	272,948	1,463,062	480,475	118,721	58,205	1,097
Hardwoods																
Select white oak	819,566	4,205	14,052	8,139	-	-	-	79	34	612,351	44,489	115,527	19,078	1,612	-	-
Other white oak	644	-	-	-	-	-	-	-	-	-	644	-	-	-	-	-
Select red oak	1,604,647	23,034	31,287	11,300	1,526	919	-	122	206	1,049,942	23,247	326,712	128,559	7,423	370	-
Other red oak	397,604	12,674	17,031	4,348	-	-	-	-	-	306,058	8,507	38,476	10,067	-	443	-
Select hickory	92,659	280	-	-	-	-	-	-	-	53,688	2,421	36,170	100	-	-	-
Other hickory	65,120	1,415	211	-	-	-	-	-	-	32,461	1,103	29,930	-	-	-	-
Basswood	903,635	2,301	898	192	1,220	51	-	2,891	-	20,319	34,562	810,122	28,229	2,780	70	-
Beech	477,377	-	475	88	461	-	-	-	-	9,883	4,386	455,291	6,793	-	-	-
Yellow birch	498,381	154	-	951	8,072	449	203	20,449	117	1,094	28,230	428,955	7,181	2,202	324	-
Hard maple	4,042,740	2,443	8,266	5,249	9,369	1,681	350	9,492	-	24,870	23,429	3,867,154	73,167	16,400	870	-
Soft maple	3,452,234	6,916	26,553	14,845	37,293	7,512	4,841	72,855	1,401	226,556	763,816	1,965,397	275,211	46,629	2,409	-
Elm	282,103	420	117	-	433	412	-	1,760	342	13,690	85,704	169,513	7,683	871	1,158	-
Black ash	338,088	-	-	726	6,346	476	212	34,181	122	3,468	180,815	88,881	14,406	2,840	5,615	-
White and green ash	814,075	593	2,029	92	288	116	-	7,031	182	47,263	202,662	521,910	26,088	5,071	750	-
Sycamore	23,004	-	-	-	-	-	-	-	-	1,114	15,587	6,303	-	-	-	-
Cottonwood	131,894	177	-	-	-	-	-	474	-	6,818	79,321	40,841	3,992	101	170	-
Willow	43,316	-	73	-	-	134	-	-	-	957	30,101	11,111	526	275	139	-
Hackberry	4,628	-	-	-	-	-	-	-	-	858	1,620	2,150	-	-	-	-
Balsam poplar	345,096	3,428	792	2,376	14,707	2,939	1,709	51,153	1,210	1,157	31,280	31,848	77,103	15,971	109,423	-
Bigtooth aspen	1,236,719	3,712	21,464	8,428	3,987	296	1,726	4,452	173	177,065	19,207	263,295	715,881	15,865	1,168	-
Quaking aspen	1,971,082	15,922	21,666	13,752	70,019	19,170	15,921	52,803	1,438	36,392	94,778	458,639	1,106,097	43,853	20,525	107
Paper birch	844,859	1,915	8,289	12,347	45,304	14,288	11,213	92,477	2,582	19,073	50,997	220,389	158,413	197,352	10,220	-
Tupelo	6,192	-	-	-	-	-	-	-	-	1,859	2,554	811	537	431	-	-
Black cherry	496,151	7,513	5,870	598	4,234	993	348	2,225	420	73,886	23,543	350,697	24,598	834	392	-
Black walnut	54,445	-	159	-	-	-	-	-	-	30,781	1,326	22,179	-	-	-	-
Butternut	8,718	-	-	-	-	-	-	485	-	1,826	1,385	5,022	-	-	-	-
Yellow-poplar	38,756	397	81	-	-	-	-	-	-	3,956	6,938	27,384	-	-	-	-
Sassafras	48,629	1,145	-	-	-	-	-	-	-	15,371	787	30,993	333	-	-	-
Other hardwoods	30,453	-	608	-	56	-	-	176	-	1,319	10,193	17,136	553	-	412	-
Total hardwoods	19,072,815	88,644	159,921	83,431	203,315	49,436	36,523	353,105	8,227	2,774,075	1,773,632	10,342,836	2,684,595	360,510	154,458	107
All species	26,644,885	730,408	1,612,009	398,749	625,706	164,440	325,813	2,029,869	97,986	2,949,259	2,046,580	11,805,898	3,165,070	479,231	212,663	1,204

Table 49. -- Net volume of sawtimber on timberland by species group and forest type, Michigan, 1993

(In thousand board feet)[1]

Species group	All types	Forest type														
		Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar	Tamarack	Oak-hickory	Elm-ash-soft maple	Maple-beech-birch	Aspen	Paper birch	Balsam poplar	Non-stocked
Softwoods																
Jack pine	1,474,600	1,078,518	128,577	18,229	6,749	4,824	38,746	-	1,278	120,431	1,543	20,674	41,736	11,406	-	1,889
Red pine	4,791,938	296,781	3,491,008	165,316	43,960	8,128	36,923	27,434	1,075	177,862	30,119	238,814	249,252	21,384	1,514	2,368
White pine	3,973,439	68,570	309,777	1,062,595	176,646	44,230	117,574	315,403	13,867	227,554	126,179	1,130,361	306,448	68,847	5,388	-
White spruce	1,950,136	10,561	31,498	52,314	318,674	238,609	22,504	189,615	2,030	7,330	92,071	561,643	346,639	50,276	26,372	-
Black spruce	508,901	6,202	3,339	10,368	70,051	7,405	154,219	150,657	11,868	-	21,884	41,769	18,148	7,724	5,267	-
Balsam fir	1,481,028	4,571	14,763	13,082	335,860	31,987	28,506	127,054	2,869	3,033	89,234	405,161	320,164	52,808	51,936	-
Hemlock	3,154,012	-	8,719	13,714	24,771	1,132	7,916	103,917	-	11,019	117,824	2,799,290	39,980	22,325	3,405	-
Tamarack	430,682	733	4,070	641	32,019	3,390	46,450	104,442	145,612	-	36,006	21,212	15,221	8,982	11,904	-
Eastern redcedar	4,877	-	-	-	-	-	-	-	-	3,598	-	1,279	-	-	-	-
Northern white-cedar	4,696,896	1,369	4,080	11,217	196,886	20,551	32,710	3,023,906	26,464	3,180	323,736	708,012	186,416	94,399	63,970	-
Other softwoods	226,052	128,294	26,423	500	1,839	3,595	-	-	-	10,625	2,585	50,558	872	761	-	-
Total softwoods	22,692,561	1,595,599	4,022,254	1,347,976	1,207,455	363,851	485,548	4,042,428	205,063	564,632	841,181	5,978,773	1,524,876	338,912	169,756	4,257
Hardwoods																
Select white oak	2,659,883	9,101	41,292	28,053	-	-	-	-	-	1,945,551	173,798	404,216	52,696	5,176	-	-
Select red oak	5,513,432	55,893	114,887	35,953	3,660	533	-	-	989	3,557,496	88,220	1,219,345	408,513	26,091	1,852	-
Other red oak	1,320,026	28,231	60,814	8,105	-	-	-	-	-	1,036,293	33,108	127,542	25,386	-	547	-
Select hickory	271,408	-	-	-	-	-	-	-	-	150,396	6,909	114,103	-	-	-	-
Other hickory	178,167	5,588	-	-	-	-	-	-	-	89,379	2,677	80,523	-	-	-	-
Basswood	2,504,525	6,170	1,962	465	3,901	264	-	8,441	-	42,948	83,677	2,282,330	68,200	6,167	-	-
Beech	1,676,951	-	2,499	-	1,326	-	-	-	-	28,956	17,947	1,615,972	10,251	-	-	-
Yellow birch	1,473,171	784	-	894	28,629	2,172	-	66,573	549	2,602	81,867	1,277,457	7,447	2,627	1,570	-
Hard maple	9,282,920	3,270	16,446	7,608	16,403	994	-	18,883	-	63,578	39,148	9,013,555	78,120	22,370	2,545	-
Soft maple	7,708,538	7,161	42,577	13,481	54,716	11,336	5,980	133,184	1,330	361,285	2,260,157	4,372,800	365,408	72,075	7,048	-
Elm	431,468	1,680	-	-	1,225	1,666	-	2,596	471	11,282	115,916	282,675	12,607	734	616	-
Black ash	475,217	-	-	1,911	6,442	-	-	22,615	-	978	286,146	139,030	12,311	807	4,977	-
White and green ash	2,214,657	2,661	4,970	282	-	278	-	12,954	-	139,342	518,530	1,475,355	51,248	7,794	1,243	-
Sycamore	107,688	-	-	-	-	-	-	-	-	5,861	74,984	26,843	-	-	-	-
Cottonwood	520,161	693	-	-	-	-	-	2,256	-	29,541	299,673	173,027	14,126	-	845	-
Willow	157,770	-	-	-	-	679	-	-	-	2,396	106,532	45,474	1,291	1,398	-	-
Hackberry	7,544	-	-	-	-	-	-	-	-	-	4,681	2,863	-	-	-	-
Balsam poplar	977,493	8,442	1,748	11,136	34,627	10,108	2,730	153,705	1,601	3,675	85,344	107,909	226,550	42,727	287,191	-
Bigtooth aspen	3,293,765	5,563	44,993	21,419	11,381	1,262	4,168	11,543	773	428,199	43,540	801,795	1,860,017	56,755	2,357	-
Quaking aspen	4,736,558	21,332	25,839	27,239	127,290	31,060	20,742	150,481	1,547	57,524	241,485	1,295,002	2,546,674	135,818	54,525	-
Paper birch	1,209,190	2,637	11,054	19,711	61,786	14,653	18,267	115,394	2,641	17,088	90,576	422,054	204,202	215,261	13,866	-
Tupelo	11,271	-	-	-	-	-	-	-	-	2,033	7,352	-	-	1,886	-	-
Black cherry	1,087,087	7,943	4,958	252	2,221	1,716	-	3,052	702	180,021	45,691	803,284	35,920	491	836	-
Black walnut	160,994	-	675	-	-	-	-	-	-	102,634	5,428	52,257	-	-	-	-
Butternut	27,239	-	-	-	-	-	-	2,470	-	5,719	3,433	15,617	-	-	-	-
Yellow-poplar	162,735	1,946	-	-	-	-	-	-	-	19,258	28,911	112,620	-	-	-	-
Sassafras	69,742	-	-	-	-	-	-	-	-	20,132	1,042	47,908	660	-	-	-
Other hardwoods	39,053	-	-	-	-	-	-	-	-	1,936	19,463	17,654	-	-	-	-
Total hardwoods	48,278,653	169,095	374,714	176,509	353,607	76,721	51,887	704,147	10,603	8,306,103	4,766,235	26,329,210	5,981,627	598,177	380,018	-
All species	70,971,214	1,764,694	4,396,968	1,524,485	1,561,062	440,572	537,435	4,746,575	215,666	8,870,735	5,607,416	32,307,983	7,506,503	937,089	549,774	4,257

[1] International 1/4-inch rule.

Table 50. -- Net volume of growing stock on timberland by species group and ownership class, Michigan, 1993

(In thousand cubic feet)

Species group	Total	Ownership class							
		National forest	Other federal	State	County & municipal	Indian	Forest industry	Individual	Corporate
Softwoods									
Jack pine	603,319	177,334	11,763	241,647	14,487	-	5,814	117,418	34,856
Red pine	1,626,692	555,149	4,806	469,769	36,764	-	12,112	446,319	101,773
White pine	869,620	139,074	969	208,547	12,206	-	54,282	331,815	122,727
White spruce	494,221	82,569	3,201	87,830	3,505	428	72,425	159,480	84,783
Black spruce	365,055	67,821	434	113,096	3,977	200	51,413	89,414	38,700
Balsam fir	822,551	98,659	5,430	163,752	7,384	238	122,943	304,049	120,096
Hemlock	661,724	116,974	1,445	71,794	7,646	2,223	146,744	197,319	117,579
Tamarack	180,922	21,709	-	49,881	3,121	-	19,489	67,710	19,012
Eastern redcedar	2,931	-	-	323	-	-	-	2,367	241
Northern white-cedar	1,832,717	219,364	1,039	483,350	16,587	1,328	278,583	644,577	187,889
Other softwoods	112,318	893	-	1,925	3,301	-	-	99,368	6,831
Total softwoods	7,572,070	1,479,546	29,087	1,891,914	108,978	4,417	763,805	2,459,836	834,487
Hardwoods									
Select white oak	819,566	91,622	-	126,445	21,128	-	4,918	500,812	74,641
Other white oak	644	-	-	-	-	-	-	644	-
Select red oak	1,604,647	150,229	1,530	337,187	24,609	-	25,526	895,574	169,992
Other red oak	397,604	90,370	1,103	47,966	6,829	-	-	230,907	20,429
Select hickory	92,659	-	-	4,756	4,115	-	-	72,584	11,204
Other hickory	65,120	-	-	5,850	434	-	-	55,068	3,768
Basswood	903,635	87,721	-	174,576	11,970	1,493	61,907	462,713	103,255
Beech	477,377	57,340	4,300	56,312	6,138	-	40,539	244,070	68,678
Yellow birch	498,381	84,104	3,361	54,436	6,566	2,623	129,227	136,315	81,749
Hard maple	4,042,740	519,188	7,334	510,311	55,144	8,430	705,749	1,660,240	576,344
Soft maple	3,452,234	415,182	7,434	535,300	47,117	3,944	291,574	1,758,792	392,891
Elm	282,103	3,060	229	24,174	4,866	100	9,424	216,000	24,250
Black ash	338,088	43,311	-	55,093	8,230	1,296	32,271	157,757	40,130
White & green ash	814,075	26,376	291	73,872	13,463	-	18,170	584,640	97,263
Sycamore	23,004	-	-	-	-	-	-	22,688	316
Cottonwood	131,894	-	-	5,402	3,568	-	-	108,235	14,689
Willow	43,316	139	-	3,832	722	-	-	36,173	2,450
Hackberry	4,628	-	-	-	-	-	-	4,628	-
Balsam poplar	345,096	23,383	-	68,808	3,974	568	26,200	188,387	33,776
Bigtooth aspen	1,236,719	106,999	3,220	265,025	14,464	346	10,070	698,301	138,294
Quaking aspen	1,971,082	214,798	12,503	390,967	18,458	2,596	125,576	977,828	228,356
Paper birch	844,859	85,302	3,052	201,885	6,780	589	68,495	361,389	117,367
Tupelo	6,192	-	-	787	-	-	-	5,405	-
Black cherry	496,151	49,018	829	57,291	7,921	90	22,116	298,619	60,267
Black walnut	54,445	-	-	4,033	1,481	-	-	46,898	2,033
Butternut	8,718	202	-	-	-	-	-	7,785	731
Yellow-poplar	38,756	-	-	1,758	386	-	-	36,114	498
Sassafras	48,629	109	-	8,812	464	-	-	38,098	1,146
Other hardwoods	30,453	-	119	613	1,691	-	77	26,504	1,449
Total hardwoods	19,072,815	2,048,453	45,305	3,015,491	270,518	22,075	1,571,839	9,833,168	2,265,966
All species	26,644,885	3,527,999	74,392	4,907,405	379,496	26,492	2,335,644	12,293,004	3,100,453

Table 51. -- Net volume of sawtimber on timberland by species group and ownership class, Michigan, 1993

(In thousand board feet)[1]

Species group	Total	Ownership class							
		National forest	Other federal	State	County & municipal	Indian	Forest industry	Individual	Corporate
Softwoods									
Jack pine	1,474,600	329,170	30,228	638,896	41,869	-	23,110	314,123	97,204
Red pine	4,791,938	1,696,907	23,511	1,586,360	93,129	-	32,113	1,077,592	282,326
White pine	3,973,439	627,846	3,046	958,132	59,332	-	276,658	1,442,263	606,162
White spruce	1,950,136	330,928	15,742	361,859	12,936	1,479	307,438	577,543	342,211
Black spruce	508,901	97,698	668	152,664	9,038	-	74,503	111,141	63,189
Balsam fir	1,481,028	160,580	14,338	317,227	10,561	552	198,592	535,000	244,178
Hemlock	3,154,012	577,885	7,568	333,677	37,667	11,134	726,416	888,856	570,809
Tamarack	430,682	62,225	-	91,627	13,904	-	42,901	169,948	50,077
Eastern redcedar	4,877	-	-	-	-	-	-	4,877	-
Northern white-cedar	4,696,896	582,635	2,922	1,161,075	35,833	2,858	891,879	1,484,037	535,657
Other softwoods	226,052	3,099	-	5,345	14,950	-	-	187,829	14,829
Total softwoods	22,692,561	4,468,973	98,023	5,606,862	329,219	16,023	2,573,610	6,793,209	2,806,642
Hardwoods									
Select white oak	2,659,883	239,384	-	347,019	79,765	-	13,468	1,743,528	236,719
Select red oak	5,513,432	470,833	6,180	1,066,598	87,570	-	86,267	3,209,322	586,662
Other red oak	1,320,026	254,210	-	167,051	20,938	-	-	806,637	71,190
Select hickory	271,408	-	-	12,367	7,954	-	-	210,831	40,256
Other hickory	178,167	-	-	9,995	741	-	-	156,701	10,730
Basswood	2,504,525	245,923	-	473,188	15,527	6,603	171,389	1,327,956	263,939
Beech	1,676,951	199,464	18,026	162,257	22,012	-	147,220	875,288	252,684
Yellow birch	1,473,171	264,321	8,139	158,335	13,463	10,951	418,774	366,954	232,234
Hard maple	9,282,920	1,155,947	14,063	995,542	116,427	17,131	1,902,909	3,636,668	1,444,233
Soft maple	7,708,538	848,423	7,158	975,700	120,569	5,257	664,698	4,281,620	805,113
Elm	431,468	6,632	1,031	41,940	10,773	-	27,883	281,828	61,381
Black ash	475,217	63,266	-	58,744	11,272	578	68,286	186,153	86,918
White & green ash	2,214,657	64,519	1,411	191,610	41,259	-	41,934	1,615,063	258,861
Sycamore	107,688	-	-	-	-	-	-	106,108	1,580
Cottonwood	520,161	-	-	20,089	16,657	-	-	439,465	43,950
Willow	157,770	-	-	11,475	3,217	-	-	134,214	8,864
Hackberry	7,544	-	-	-	-	-	-	7,544	-
Balsam poplar	977,493	56,790	-	197,792	18,269	1,497	63,346	541,335	98,464
Bigtooth aspen	3,293,765	250,507	10,397	690,293	29,108	1,538	26,288	1,877,019	408,615
Quaking aspen	4,736,558	524,819	32,986	931,445	48,885	7,051	324,599	2,279,935	586,838
Paper birch	1,209,190	101,486	4,850	290,374	6,976	-	144,927	484,749	175,828
Tupelo	11,271	-	-	1,886	-	-	-	9,385	-
Black cherry	1,087,087	101,668	1,983	119,646	18,841	-	42,928	695,422	106,599
Black walnut	160,994	-	-	7,330	-	-	-	149,023	4,641
Butternut	27,239	1,000	-	-	-	-	-	23,993	2,246
Yellow-poplar	162,735	-	-	8,595	1,779	-	-	149,697	2,664
Sassafras	69,742	-	-	7,307	-	-	-	58,544	3,891
Other hardwoods	39,053	-	546	-	6,498	-	-	32,009	-
Total hardwoods	48,278,653	4,849,192	106,770	6,946,578	698,500	50,606	4,144,916	25,686,991	5,795,100
All species	70,971,214	9,318,165	204,793	12,553,440	1,027,719	66,629	6,718,526	32,480,200	8,601,742

[1] International 1/4-inch rule.

Table 52. -- Net volume of growing stock on timberland by forest type, stand-age class, and Forest Survey Unit, Michigan, 1993

(In thousand cubic feet)

Forest Survey Unit and forest type	All classes	Stand-age class (years) 1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-140	141+
Eastern Upper Peninsula														
Jack pine	204,313	112	1,748	9,232	26,456	42,276	61,482	31,101	15,250	12,313	1,521	2,822	-	-
Red pine	246,987	-	7,595	14,871	45,461	76,875	48,262	21,896	5,857	14,455	3,527	1,203	6,985	-
White pine	120,185	-	4,695	1,658	723	6,530	22,475	24,819	6,905	3,993	1,204	19,042	14,311	13,830
Balsam fir	220,831	7,012	23,093	17,064	14,041	39,124	54,830	32,009	13,592	3,389	3,314	12,057	1,306	-
White spruce	66,381	544	4,969	9,112	1,927	13,058	14,429	14,588	3,129	2,597	2,028	-	-	-
Black spruce	148,485	-	5,167	24,059	25,346	23,508	20,739	20,722	9,656	7,597	4,035	4,956	2,700	-
Northern white-cedar	899,785	2,462	4,671	11,487	46,742	56,691	90,191	108,122	104,190	116,519	67,570	124,321	77,437	89,382
Tamarack	28,044	970	605	1,693	1,097	5,214	2,367	4,260	1,644	7,531	1,663	-	1,000	-
Oak-hickory	36,540	-	10,716	1,628	1,410	5,889	5,396	3,054	3,899	749	1,299	2,500	-	-
Elm-ash-soft maple	268,784	3,394	14,345	7,750	8,740	36,828	44,996	30,845	25,186	20,382	5,677	22,944	36,142	11,555
Maple-beech-birch	2,097,400	25,435	55,103	32,780	84,817	183,999	284,343	305,607	200,024	201,010	219,210	208,676	192,632	103,764
Aspen	517,196	19,580	33,097	25,634	23,796	61,207	115,026	122,656	58,213	19,326	19,017	17,612	2,032	-
Paper birch	132,357	-	1,438	6,335	1,470	7,283	33,032	30,141	30,563	3,869	4,592	6,780	6,854	-
Balsam poplar	116,411	3,068	5,917	8,286	4,827	17,530	27,100	15,478	9,309	1,197	8,524	8,879	6,296	-
Nonstocked	289	133	156	-	-	-	-	-	-	-	-	-	-	-
All types	5,103,988	62,710	173,315	171,589	286,853	576,012	824,668	765,298	487,417	414,927	343,181	431,792	347,695	218,531
Western Upper Peninsula														
Jack pine	98,487	551	2,377	4,019	3,901	15,256	31,853	22,429	7,652	1,889	2,363	2,404	3,793	-
Red pine	153,957	-	4,756	8,690	37,011	37,574	4,560	7,438	-	19,285	14,764	16,526	3,353	-
White pine	93,409	1,486	128	524	-	2,629	5,085	7,119	7,729	16,998	30,854	16,438	-	4,419
Balsam fir	337,938	2,940	18,358	12,711	38,796	38,603	76,770	42,232	33,329	27,862	27,202	10,861	5,416	2,858
White spruce	73,366	40	592	7,127	8,504	9,809	7,304	12,261	10,378	7,277	6,719	3,355	-	-
Black spruce	163,391	1,899	10,606	17,978	21,266	13,411	19,753	33,719	27,208	13,180	1,446	-	2,925	-
Northern white-cedar	444,710	-	2,419	5,050	5,109	23,452	31,130	39,717	47,452	54,495	43,197	75,372	53,485	63,832
Tamarack	33,965	298	3,317	2,936	348	5,274	10,801	3,877	1,685	1,060	-	1,563	1,145	1,661
Oak-hickory	48,595	113	1,733	879	-	4,995	-	8,476	9,856	4,534	6,049	10,342	-	1,618
Elm-ash-soft maple	233,681	287	7,756	8,907	11,452	17,096	19,632	40,710	25,647	16,709	14,475	19,635	19,380	31,995
Maple-beech-birch	4,507,631	27,484	93,636	59,158	128,876	365,666	644,818	644,666	317,670	416,017	415,998	585,962	476,095	331,585
Aspen	777,337	21,956	47,662	42,222	48,983	112,561	194,264	151,099	74,440	41,100	24,219	4,884	13,947	-
Paper birch	179,246	52	1,003	1,207	2,913	17,965	43,194	45,324	40,050	9,758	4,245	4,675	3,440	5,420
Balsam poplar	38,253	521	-	1,380	2,980	9,325	3,054	5,609	6,445	2,814	1,754	4,371	-	-
Nonstocked	199	199	-	-	-	-	-	-	-	-	-	-	-	-
All types	7,184,165	57,826	194,343	172,788	310,139	673,616	1,092,218	1,064,676	609,541	632,978	593,285	756,388	582,979	443,388

(Table 52 continued on next page)

(Table 52 continued)

Forest Survey Unit and forest type	All classes	Stand-age class (years) 1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-140	141+
Northern Lower Peninsula														
Jack pine	379,827	2,471	16,204	45,796	97,265	71,730	70,191	42,660	11,895	20,002	1,613	-	-	-
Red pine	1,120,647	2,804	35,433	201,363	399,840	175,742	149,201	27,542	19,684	23,633	49,957	18,736	16,712	-
White pine	155,621	96	1,082	6,804	22,621	11,605	9,050	26,046	17,432	8,127	17,050	29,797	1,513	4,398
Balsam fir	66,937	-	3,582	12,105	5,049	1,588	6,140	17,521	11,972	-	3,206	-	-	5,774
White spruce	18,043	301	309	9,224	-	-	1,764	778	3,274	-	-	-	-	2,393
Black spruce	13,937	-	2,665	1,254	384	1,835	-	6,227	-	-	1,572	-	-	-
Northern white-cedar	680,037	177	3,629	7,159	18,824	21,352	45,968	90,060	110,570	96,358	61,741	97,280	72,990	53,929
Tamarack	31,253	-	2,018	5,127	3,689	7,299	-	8,961	-	522	1,098	2,081	458	-
Oak-hickory	1,566,664	15,678	38,112	34,914	60,656	100,138	248,844	289,101	231,489	143,087	125,324	150,500	99,115	29,706
Elm-ash-soft maple	674,108	8,130	37,410	38,739	46,673	123,002	81,337	69,390	76,881	58,171	43,928	62,864	15,469	12,114
Maple-beech-birch	3,444,326	32,162	108,868	102,429	151,103	363,233	701,903	617,675	385,879	239,302	325,469	219,439	148,278	48,586
Aspen	1,748,603	34,495	78,627	152,290	123,937	273,367	282,284	313,450	210,054	131,569	71,945	43,827	25,369	7,389
Paper birch	167,339	73	1,500	2,003	8,332	16,536	38,625	25,731	33,107	25,886	-	3,954	11,592	-
Balsam poplar	53,668	663	7,496	528	2,452	-	12,865	10,460	5,826	1,974	5,908	-	-	5,496
Nonstocked	716	551	165	-	-	-	-	-	-	-	-	-	-	-
All types	10,121,726	97,601	337,100	619,735	940,825	1,167,427	1,648,172	1,545,602	1,118,063	748,631	708,811	628,478	391,496	169,785
Southern Lower Peninsula														
Jack pine	47,781	79	1,220	14,533	8,070	7,196	12,419	-	4,264	-	-	-	-	-
Red pine	90,418	-	-	6,113	40,986	28,043	6,148	9,128	-	-	-	-	-	-
White pine	29,534	-	2,013	9,917	3,658	-	3,322	-	10,624	-	-	-	-	-
White spruce	6,650	-	-	3,450	3,200	-	-	-	-	-	-	-	-	-
Northern white-cedar	5,337	-	-	-	2,912	-	-	-	2,425	-	-	-	-	-
Tamarack	4,724	-	-	1,069	170	3,485	-	-	-	-	-	-	-	-
Oak-hickory	1,297,460	4,938	30,547	24,457	32,532	82,665	105,677	134,710	192,198	200,466	168,754	167,453	144,679	8,384
Elm-ash-soft maple	870,007	5,773	63,023	41,390	72,389	111,183	108,701	170,070	67,358	28,696	72,632	110,630	18,162	-
Maple-beech-birch	1,756,541	29,297	73,323	148,888	177,492	241,795	183,856	161,152	230,643	134,628	166,986	154,846	42,256	11,379
Aspen	121,934	897	34,264	35,592	10,975	3,456	-	26,046	3,365	-	-	-	-	7,339
Paper birch	289	-	289	-	-	-	-	-	-	-	-	-	-	-
Balsam poplar	4,331	-	-	736	-	2,398	-	1,197	-	-	-	-	-	-
Nonstocked	-	-	-	-	-	-	-	-	-	-	-	-	-	-
All types	4,235,006	40,984	204,679	286,145	352,384	480,221	420,123	502,303	510,877	363,790	408,372	432,929	205,097	27,102
All units														
Jack pine	730,408	3,213	21,549	73,580	135,692	136,458	175,945	96,190	39,061	34,204	5,497	5,226	3,793	-
Red pine	1,612,009	2,804	47,784	231,037	523,298	318,234	208,171	66,004	25,541	57,373	68,248	36,465	27,050	-
White pine	398,749	1,582	7,918	18,903	27,002	20,764	39,932	57,984	42,690	29,118	49,108	65,277	15,824	22,647
Balsam fir	625,706	9,952	45,033	41,880	57,886	79,315	137,740	91,762	58,893	31,251	33,722	22,918	6,722	8,632
White spruce	164,440	885	5,870	28,913	13,631	22,867	23,497	27,627	16,781	9,874	8,747	3,355	-	2,393
Black spruce	325,813	1,899	18,438	43,291	46,996	38,754	40,492	60,668	36,864	20,777	7,053	4,956	5,625	-
Northern white-cedar	2,029,869	2,639	10,719	23,696	73,587	101,495	167,289	237,899	264,637	267,372	172,508	296,973	203,912	207,143
Tamarack	97,986	1,268	5,940	10,825	5,304	21,272	13,168	17,098	3,329	9,113	2,761	3,644	2,603	1,661
Oak-hickory	2,949,259	20,729	81,108	61,878	94,598	193,687	359,917	435,341	437,442	348,836	301,426	330,795	243,794	39,708
Elm-ash-soft maple	2,046,580	17,584	122,534	96,786	139,254	288,109	254,666	311,015	195,072	123,958	136,712	216,073	89,153	55,664
Maple-beech-birch	11,805,898	114,378	330,930	343,255	542,288	1,154,693	1,814,920	1,729,100	1,134,216	990,957	1,127,663	1,168,923	859,261	495,314
Aspen	3,165,070	76,928	193,650	255,738	207,691	450,591	591,574	613,251	346,072	191,995	115,181	66,323	41,348	14,728
Paper birch	479,231	125	4,230	9,545	12,715	41,784	114,851	101,196	103,720	39,513	8,837	15,409	21,886	5,420
Balsam poplar	212,663	4,252	13,413	10,930	10,259	29,253	43,019	32,744	21,580	5,985	16,186	13,250	6,296	5,496
Nonstocked	1,204	883	321	-	-	-	-	-	-	-	-	-	-	-
All types	26,644,885	259,121	909,437	1,250,257	1,890,201	2,897,276	3,985,181	3,877,879	2,725,898	2,160,326	2,053,649	2,249,587	1,527,267	858,806

Table 53. -- Net volume of sawtimber on timberland by forest type, stand-age class, and Forest Survey Unit, Michigan, 1993

(In thousand board feet)[1]

Forest Survey Unit and forest type	All classes	Stand-age class (years)												
		1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-140	141+
Eastern Upper Peninsula														
Jack pine	536,221	326	2,448	24,448	71,878	102,673	119,819	90,039	62,982	43,521	7,427	10,660	-	-
Red pine	926,868	-	28,068	16,725	122,991	297,515	220,144	101,256	24,966	66,929	16,940	5,766	25,568	-
White pine	472,730	-	15,241	7,619	2,184	23,173	69,920	99,891	23,113	16,106	4,587	86,813	56,448	67,635
Balsam fir	504,926	19,095	51,586	32,953	27,560	71,321	119,437	74,830	31,231	13,505	12,640	44,852	5,916	-
White spruce	175,439	1,678	3,855	14,811	5,745	30,552	35,872	53,176	11,484	8,237	10,029	-	-	-
Black spruce	246,883	-	8,485	45,063	33,605	44,396	29,081	37,063	14,446	17,607	3,763	13,374	-	-
Northern white-cedar	1,999,179	7,709	7,284	21,663	79,225	65,336	163,116	196,475	197,867	211,361	172,520	352,236	254,089	270,298
Tamarack	49,071	1,302	1,690	2,087	1,737	-	7,227	5,391	-	22,772	4,726	-	2,139	-
Oak-hickory	81,380	-	19,142	3,147	1,665	7,120	11,927	10,454	11,261	2,798	5,087	8,779	-	-
Elm-ash-soft maple	646,919	8,399	31,283	6,933	11,644	63,713	80,999	72,251	55,345	57,067	20,440	67,537	130,551	40,757
Maple-birch	5,747,112	52,141	93,043	55,786	135,838	390,310	607,820	679,458	562,796	611,436	725,521	720,656	677,746	434,561
Aspen	1,173,267	31,617	52,783	44,420	40,669	111,850	252,775	276,060	171,401	65,436	60,923	58,914	6,419	-
Paper birch	231,856	-	2,025	7,979	2,466	7,956	48,920	52,612	53,821	5,804	8,751	21,214	20,308	-
Balsam poplar	306,780	8,325	8,407	12,162	7,455	32,591	74,052	40,685	26,871	4,910	34,232	33,395	23,695	-
Nonstocked	826	-	826	-	-	-	-	-	-	-	-	-	-	-
All types	13,099,457	130,592	326,166	295,796	544,662	1,248,506	1,841,109	1,789,641	1,247,584	1,147,489	1,087,586	1,424,196	1,202,879	813,251
Western Upper Peninsula														
Jack pine	320,035	840	1,196	7,219	15,268	41,800	102,066	93,571	22,770	8,704	3,977	9,326	13,298	-
Red pine	529,390	-	3,719	19,558	108,016	116,070	17,217	23,914	-	87,593	67,884	69,973	15,446	-
White pine	368,418	4,863	-	2,966	-	10,732	13,184	24,577	26,631	69,820	126,475	71,648	-	17,522
Balsam fir	902,672	9,046	43,039	24,121	73,927	76,687	208,885	114,192	104,135	89,230	90,106	39,959	19,071	10,274
White spruce	211,392	-	946	12,491	17,193	23,480	22,102	29,186	36,933	29,660	26,188	13,213	-	-
Black spruce	268,693	5,101	14,104	16,355	24,308	22,875	26,526	59,131	57,153	25,272	5,586	-	12,282	-
Northern white-cedar	1,262,540	-	7,217	10,700	10,189	39,016	56,738	92,163	104,317	138,782	123,823	283,174	174,704	221,717
Tamarack	78,458	-	8,398	3,216	426	11,090	24,058	12,054	3,296	-	-	4,240	4,318	7,362
Oak-hickory	136,448	409	4,756	874	-	5,844	-	22,304	24,846	13,551	17,003	42,869	-	3,992
Elm-ash-soft maple	597,248	1,062	10,661	12,303	14,371	32,243	39,631	95,336	59,679	47,662	49,515	66,709	64,619	103,457
Maple-birch	12,581,959	68,083	199,738	109,001	220,543	715,475	1,288,754	1,451,382	843,296	1,257,904	1,377,309	2,024,433	1,752,471	1,273,570
Aspen	1,915,746	63,360	88,266	69,299	88,880	229,408	460,900	388,696	245,907	138,712	76,623	16,514	49,181	-
Paper birch	349,805	266	2,554	2,390	1,471	25,687	68,273	75,817	90,539	29,466	11,975	13,559	12,975	14,833
Balsam poplar	99,854	2,271	-	1,742	5,745	19,003	2,192	16,912	14,997	11,173	8,037	17,782	-	-
Nonstocked	451	451	-	-	-	-	-	-	-	-	-	-	-	-
All types	19,623,109	155,752	384,594	292,235	580,337	1,369,410	2,330,526	2,499,235	1,634,499	1,947,529	1,984,501	2,673,399	2,118,365	1,652,727

(Table 53 continued on next page)

(Table 53 continued)

Forest Survey Unit and forest type	All classes	Stand-age class (years) 1-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-140	141+
Northern Lower Pennisula														
Jack pine	809,286	1,422	26,006	82,374	149,790	139,540	170,931	124,245	40,964	66,136	7,878	-	-	-
Red pine	2,643,829	7,429	33,220	231,469	642,411	560,414	536,921	105,549	86,774	93,141	215,185	85,285	46,031	-
White pine	592,078	-	4,395	10,956	75,037	31,479	35,312	103,791	68,232	33,167	79,435	122,698	7,211	20,365
Balsam fir	153,464	-	6,522	21,562	9,352	2,246	14,698	51,202	20,435	-	9,581	-	-	17,866
White spruce	36,734	659	1,140	7,555	-	-	6,892	1,407	9,513	-	-	-	-	9,568
Black spruce	21,859	-	2,518	3,917	810	1,752	-	6,189	-	-	6,673	-	-	-
Northern white-cedar	1,473,268	767	8,454	14,470	29,972	24,665	96,551	149,406	174,090	178,173	161,376	260,684	223,322	151,338
Tamarack	75,765	-	8,639	16,312	351	10,593	-	27,741	-	2,110	3,222	5,316	1,481	-
Oak-hickory	4,229,414	48,579	91,814	63,012	113,305	221,181	562,634	662,303	620,676	442,034	395,492	542,888	345,305	120,191
Elm-ash-soft maple	1,720,721	8,431	57,059	73,583	64,746	265,183	168,893	193,766	203,918	173,630	162,865	257,316	56,157	35,174
Maple-birch	8,768,866	70,360	206,099	175,910	295,728	754,674	1,402,282	1,385,332	1,130,851	783,377	1,104,881	728,995	540,399	189,978
Aspen	4,203,317	66,994	136,432	180,129	191,774	637,697	639,522	804,555	649,843	412,368	230,556	137,137	91,663	24,647
Paper birch	355,428	-	5,473	1,016	11,521	27,095	73,340	37,093	79,592	61,325	-	14,640	44,333	-
Balsam poplar	134,929	1,361	10,054	-	3,180	-	30,210	22,606	17,769	7,807	21,967	-	-	19,975
Nonstocked	2,980	2,162	818	-	-	-	-	-	-	-	-	-	-	-
All types	25,221,938	208,164	598,643	882,265	1,587,977	2,676,519	3,738,186	3,675,185	3,102,657	2,253,268	2,399,111	2,154,959	1,355,902	589,102
Southern Lower Pennisula														
Jack pine	99,152	318	1,571	19,918	14,009	14,575	34,840	-	13,921	-	-	-	-	-
Red pine	296,881	-	-	10,170	102,837	117,805	24,026	42,043	-	-	-	-	-	-
White pine	91,259	-	5,504	28,049	8,345	-	14,472	-	34,889	-	-	-	-	-
White spruce	17,007	-	-	7,768	9,239	-	-	-	-	-	-	-	-	-
Northern white-cedar	11,588	-	-	-	2,411	-	-	-	9,177	-	-	-	-	-
Tamarack	12,372	-	-	-	-	12,372	-	-	-	-	-	-	-	-
Oak-hickory	4,423,493	11,413	74,237	42,595	77,840	201,996	242,355	450,589	656,171	737,869	684,962	630,238	575,815	37,413
Elm-ash-soft maple	2,642,528	7,851	126,637	69,596	153,856	277,793	326,507	562,437	242,418	101,061	268,551	440,947	64,874	-
Maple-birch	5,210,046	69,450	122,014	256,031	359,720	584,100	536,733	533,934	775,903	538,067	596,744	612,041	183,121	42,188
Aspen	214,173	1,091	30,326	59,702	15,899	9,066	-	66,232	11,009	-	-	-	-	20,848
Balsam poplar	8,211	-	-	979	-	5,806	-	1,426	-	-	-	-	-	-
All types	13,026,710	90,123	360,289	494,808	744,156	1,223,513	1,178,933	1,656,661	1,743,488	1,376,997	1,550,257	1,683,226	823,810	100,449
All units														
Jack pine	1,764,694	2,906	31,221	133,959	250,945	298,588	427,656	307,855	140,637	118,361	19,282	19,986	13,298	-
Red pine	4,396,968	7,429	65,007	277,922	976,255	1,091,804	798,308	272,762	111,740	247,663	300,009	161,024	87,045	-
White pine	1,524,485	4,863	25,140	49,590	85,566	65,384	132,888	228,259	152,865	119,093	210,497	281,159	63,659	105,522
Balsam fir	1,561,062	28,141	101,147	78,636	110,839	150,254	343,020	240,224	155,801	102,735	112,327	84,811	24,987	28,140
White spruce	440,572	2,337	5,941	42,625	32,177	54,032	64,866	83,769	57,930	37,897	36,217	13,213	-	9,568
Black spruce	537,435	5,101	25,107	65,335	58,723	69,023	55,607	102,383	71,599	42,879	16,022	13,374	12,282	-
Northern white-cedar	4,746,575	8,476	22,955	46,833	121,797	129,017	316,405	438,044	485,451	528,316	457,719	896,094	652,115	643,353
Tamarack	215,666	1,302	18,727	21,615	2,514	34,055	31,285	45,186	3,296	24,882	7,948	9,556	7,938	7,362
Oak-hickory	8,870,735	60,401	189,949	109,628	192,810	436,141	816,916	1,145,650	1,312,954	1,196,252	1,102,544	1,224,774	921,120	161,596
Elm-ash-soft maple	5,607,416	25,743	225,640	[1]162,415	244,617	638,932	616,030	923,790	561,360	379,420	501,371	832,509	316,201	179,388
Maple-birch	32,307,983	260,034	620,894	596,728	1,011,829	2,444,559	3,835,589	4,050,106	3,312,846	3,190,784	3,804,455	4,086,125	3,153,737	1,940,297
Aspen	7,506,503	163,062	307,807	353,550	337,222	988,021	1,353,197	1,535,543	1,078,160	616,516	368,102	212,565	147,263	45,495
Paper birch	937,089	266	10,052	11,385	15,458	60,738	190,533	165,522	223,952	96,595	20,726	49,413	77,616	14,833
Balsam poplar	549,774	11,957	18,461	14,883	16,380	57,400	106,454	81,629	59,637	23,890	64,236	51,177	23,695	19,975
Nonstocked	4,257	2,613	1,644	-	-	-	-	-	-	-	-	-	-	-
All types	70,971,214	584,631	1,669,692	1,965,104	3,457,132	6,517,948	9,088,754	9,620,722	7,728,228	6,725,283	7,021,455	7,935,780	5,500,956	3,155,529

[1]International 1/4-inch rule.

Table 54. -- Net volume of growing stock on timberland by forest type, basal-area class, and stand-size class, Michigan, 1993

(In thousand cubic feet)

Forest type and stand-size class	All classes	Basal-area class (square feet per acre)													
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Jack pine															
Sawtimber	333,131	-	-	782	5,203	15,965	32,217	32,612	31,983	39,234	45,328	46,465	56,265	13,819	13,258
Poletimber	358,412	-	1,080	634	4,284	10,615	17,484	39,293	36,529	36,653	44,689	65,451	79,756	13,315	8,629
Sapling-seedling	38,865	944	2,990	4,012	6,625	6,024	2,984	4,528	7,047	1,859	716	1,136	-	-	-
Total	730,408	944	4,070	5,428	16,112	32,604	52,685	76,433	75,559	77,746	90,733	113,052	136,021	27,134	21,887
Red pine															
Sawtimber	947,806	-	1,187	-	1,876	1,972	25,900	10,380	23,598	47,842	32,515	204,892	235,815	213,040	148,789
Poletimber	628,410	-	58	580	187	5,500	4,774	10,306	28,505	20,495	41,938	65,776	95,206	147,356	207,729
Sapling-seedling	35,793	597	1,446	1,323	4,841	2,059	4,187	-	7,007	781	3,403	1,963	4,041	4,145	-
Total	1,612,009	597	2,691	1,903	6,904	9,531	34,861	20,686	59,110	69,118	77,856	272,631	335,062	364,541	356,518
White pine															
Sawtimber	356,966	-	-	124	-	1,853	2,517	20,151	8,406	25,784	33,207	66,993	89,673	62,721	45,537
Poletimber	30,372	-	-	-	271	746	723	4,465	937	2,600	1,973	7,721	8,363	2,573	-
Sapling-seedling	11,411	-	427	242	1,895	2,678	581	363	4,121	1,104	-	-	-	-	-
Total	398,749	-	427	366	2,166	5,277	3,821	24,979	13,464	29,488	35,180	74,714	98,036	65,294	45,537
Balsam fir															
Sawtimber	294,272	-	-	1,251	-	1,618	5,496	9,260	10,860	25,053	21,799	46,911	96,064	58,936	17,024
Poletimber	224,019	-	-	-	-	2,667	1,964	4,650	11,676	18,988	32,514	35,359	72,113	25,947	18,141
Sapling-seedling	107,415	1,667	1,581	2,499	5,315	10,860	7,759	19,849	23,776	10,961	9,075	9,775	3,290	1,008	-
Total	625,706	1,667	1,581	3,750	5,315	15,145	15,219	33,759	46,312	55,002	63,388	92,045	171,467	85,891	35,165
White spruce															
Sawtimber	80,857	-	-	-	-	-	2,071	6,560	1,538	6,096	13,265	18,418	20,753	12,156	-
Poletimber	63,302	-	-	-	778	-	-	-	15,627	2,635	3,982	5,530	23,288	11,462	-
Sapling-seedling	20,281	293	217	756	598	1,075	387	-	6,119	1,898	-	7,320	1,618	-	-
Total	164,440	293	217	756	1,376	1,075	2,458	6,560	23,284	10,629	17,247	31,268	45,659	23,618	-
Black spruce															
Sawtimber	65,648	-	-	-	650	2,566	2,873	9,595	3,212	6,840	5,345	13,288	21,279	-	-
Poletimber	158,715	-	207	898	-	1,841	5,415	12,976	10,552	21,783	28,240	47,086	18,496	2,842	8,379
Sapling-seedling	101,450	-	1,652	3,532	5,601	15,000	19,020	17,289	11,438	8,643	10,520	8,755	-	-	-
Total	325,813	-	1,859	4,430	6,251	19,407	27,308	39,860	25,202	37,266	44,105	69,129	39,775	2,842	8,379
Northern white-cedar															
Sawtimber	1,065,800	-	293	700	3,180	2,694	6,204	8,186	16,125	24,804	28,209	128,920	269,916	263,286	313,283
Poletimber	885,248	-	-	-	215	2,021	3,944	8,031	5,362	19,595	12,937	62,120	199,542	230,243	341,238
Sapling-seedling	78,821	268	284	296	2,461	4,132	3,222	5,737	5,420	4,390	5,048	14,597	22,752	9,017	1,197
Total	2,029,869	268	577	996	5,856	8,847	13,370	21,954	26,907	48,789	46,194	205,637	492,210	502,546	655,718
Tamarack															
Sawtimber	35,429	-	1,293	220	-	2,557	4,630	3,073	6,297	1,536	-	7,426	-	-	8,397
Poletimber	34,744	-	-	-	170	3,987	3,650	940	3,082	5,306	3,534	4,735	9,340	-	-
Sapling-seedling	27,813	494	2,186	2,484	3,873	1,891	3,075	2,043	1,832	3,390	-	5,448	1,097	-	-
Total	97,986	494	3,479	2,704	4,043	8,435	11,355	6,056	11,211	10,232	3,534	17,609	10,437	-	8,397

(Table 54 continued on next page)

(Table 54 continued)

Forest type and stand-size class	All classes	Basal-area class (square feet per acre) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Oak-hickory															
Sawtimber	2,222,295	863	-	2,735	3,836	17,532	33,145	98,330	160,029	209,949	209,690	631,163	537,255	295,674	22,094
Poletimber	624,130	-	116	121	1,456	7,643	16,720	49,937	51,845	56,995	98,028	173,068	104,883	56,449	6,869
Sapling-seedling	102,834	608	5,381	6,727	7,868	15,180	27,690	15,305	6,802	3,110	12,945	1,218	-	-	-
Total	2,949,259	1,471	5,497	9,583	13,160	40,355	77,555	163,572	218,676	270,054	320,663	805,449	642,138	352,123	28,963
Elm-ash-soft maple															
Sawtimber	1,341,059	-	-	6,747	13,085	44,461	23,637	31,593	62,085	71,545	101,572	298,615	364,307	234,354	89,058
Poletimber	545,939	-	1,468	4,975	3,768	8,743	27,815	30,369	35,759	45,083	36,274	139,249	130,520	61,825	20,091
Sapling-seedling	159,582	1,053	6,910	8,302	24,629	16,422	17,570	28,409	10,346	20,069	15,097	4,712	6,063	-	-
Total	2,046,580	1,053	8,378	20,024	41,482	69,626	69,022	90,371	108,190	136,697	152,943	442,576	500,890	296,179	109,149
Maple-birch															
Sawtimber	7,927,362	-	561	1,380	6,197	28,736	72,750	110,850	229,618	430,366	516,505	1,516,254	2,824,258	1,643,025	546,862
Poletimber	3,295,953	-	629	1,876	14,040	13,326	42,771	50,760	118,156	186,742	317,271	621,027	1,082,408	664,412	182,535
Sapling-seedling	582,583	1,797	13,639	22,079	37,503	77,783	75,956	113,151	91,286	62,170	56,642	28,059	2,518	-	-
Total	11,805,898	1,797	14,829	25,335	57,740	119,845	191,477	274,761	439,060	679,278	890,418	2,165,340	3,909,184	2,307,437	729,397
Aspen															
Sawtimber	1,730,681	-	605	-	1,927	8,680	22,090	73,441	108,436	109,961	176,286	338,358	474,056	281,796	135,045
Poletimber	1,095,429	-	-	3,213	4,892	31,239	14,571	45,039	67,194	74,263	108,573	236,461	275,627	185,289	49,068
Sapling-seedling	338,960	3,286	8,368	18,345	35,274	49,836	57,868	49,938	28,422	33,499	19,954	32,485	1,685	-	-
Total	3,165,070	3,286	8,973	21,558	42,093	89,755	94,529	168,418	204,052	217,723	304,813	607,304	751,368	467,085	184,113
Paper birch															
Sawtimber	173,606	-	-	-	-	2,204	-	8,555	3,727	6,417	14,480	36,503	63,868	29,918	7,934
Poletimber	297,659	-	-	-	672	787	6,819	3,363	6,868	6,227	22,383	59,433	113,701	59,530	17,876
Sapling-seedling	7,966	125	897	-	2,094	-	994	507	658	1,003	1,688	-	-	-	-
Total	479,231	125	897	-	2,766	2,991	7,813	12,425	11,253	13,647	38,551	95,936	177,569	89,448	25,810
Balsam poplar															
Sawtimber	121,630	-	-	730	-	3,877	5,898	9,999	-	5,064	8,810	24,696	44,128	14,277	4,151
Poletimber	70,041	-	-	-	1,933	649	2,025	8,318	-	8,533	3,294	25,829	8,417	6,847	4,196
Sapling-seedling	20,992	495	1,749	2,664	2,708	7,308	1,702	1,371	2,995	-	-	-	-	-	-
Total	212,663	495	1,749	3,394	4,641	11,834	9,625	19,688	2,995	13,597	12,104	50,525	52,545	21,124	8,347
Nonstocked	1,204	653	551	-	-	-	-	-	-	-	-	-	-	-	-
All types															
Sawtimber	16,696,542	863	3,939	14,669	35,954	134,715	239,428	432,585	665,914	1,010,491	1,207,011	3,378,902	5,097,637	3,123,002	1,351,432
Poletimber	8,312,373	-	3,558	12,297	32,666	89,764	148,675	268,447	392,092	505,898	755,630	1,548,845	2,221,660	1,468,090	864,751
Sapling-seedling	1,634,766	11,627	47,727[1]	73,261	141,285	210,248	222,995	258,490	207,269	152,877	135,088	115,468	43,064	14,170	1,197
Nonstocked	1,204	653	551	-	-	-	-	-	-	-	-	-	-	-	-
Total	26,644,885	13,143	55,775	100,227	209,905	434,727	611,098	959,522	1,265,275	1,669,266	2,097,729	5,043,215	7,362,361	4,605,262	2,217,380

Table 55. -- Net volume of sawtimber on timberland by forest type, basal-area class, and stand-size class, Michigan, 1993

(In thousand board feet)[1]

Forest type and stand-size class	Basal-area class (square feet per acre)														
	All classes	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Jack pine															
Sawtimber	1,156,899	-	-	3,081	21,566	54,696	121,201	125,701	112,887	132,780	171,294	168,304	176,655	40,009	28,725
Poletimber	552,132	-	1,183	1,501	4,884	13,628	30,766	59,973	66,713	48,786	59,887	96,905	133,443	19,033	15,430
Sapling-seedling	55,663	2,203	6,095	5,969	12,875	3,324	6,309	4,107	6,320	6,747	1,174	540	-	-	-
Total	1,764,694	2,203	7,278	10,551	39,325	71,648	158,276	189,781	185,920	188,313	232,355	265,749	310,098	59,042	44,155
Red pine															
Sawtimber	3,625,699	-	5,190	-	8,365	10,010	115,069	46,990	104,133	198,466	134,054	877,440	931,584	742,130	452,268
Poletimber	688,698	-	-	211	-	1,455	3,026	17,036	45,218	31,650	50,529	94,517	97,034	182,347	165,675
Sapling-seedling	82,571	653	3,122	4,759	14,072	1,896	13,693	-	7,572	696	15,633	6,349	-	14,126	-
Total	4,396,968	653	8,312	4,970	22,437	13,361	131,788	64,026	156,923	230,812	200,216	978,306	1,028,618	938,603	617,943
White pine															
Sawtimber	1,428,034	-	-	473	-	7,886	8,891	94,440	35,137	112,888	139,147	260,488	358,326	244,464	165,894
Poletimber	55,863	-	-	-	-	1,162	2,184	6,059	2,289	4,999	3,654	14,138	18,459	2,919	-
Sapling-seedling	40,588	-	1,844	1,088	8,606	7,300	2,807	1,402	12,757	4,784	-	-	-	-	-
Total	1,524,485	-	1,844	1,561	8,606	16,348	13,882	101,901	50,183	122,671	142,801	274,626	376,785	247,383	165,894
Balsam fir															
Sawtimber	971,787	-	-	5,553	-	7,215	18,290	30,530	43,002	87,363	78,357	158,547	298,774	194,790	49,366
Poletimber	371,813	-	-	-	-	4,915	4,838	6,131	19,979	30,635	56,308	60,767	124,985	39,418	23,837
Sapling-seedling	217,462	7,904	4,186	5,704	9,932	19,576	16,861	40,353	56,884	19,206	14,908	14,503	7,445	-	-
Total	1,561,062	7,904	4,186	11,257	9,932	31,706	39,989	77,014	119,865	137,204	149,573	233,817	431,204	234,208	73,203
White spruce															
Sawtimber	291,683	-	-	-	-	-	6,440	22,394	6,282	20,797	46,688	75,301	79,221	34,560	-
Poletimber	126,532	-	-	-	1,407	-	-	-	28,739	4,597	3,947	11,515	51,215	25,112	-
Sapling-seedling	22,357	659	876	1,942	-	-	946	-	11,529	-	-	6,405	-	-	-
Total	440,572	659	876	1,942	1,407	-	7,386	22,394	46,550	25,394	50,635	93,221	130,436	59,672	-
Black spruce															
Sawtimber	211,627	-	-	-	2,533	8,608	7,983	39,790	10,046	20,301	18,060	40,875	63,431	-	-
Poletimber	193,675	-	-	2,217	-	1,185	8,233	18,472	14,715	27,651	36,218	61,639	14,108	1,574	7,663
Sapling-seedling	132,133	-	2,961	3,390	9,215	17,091	40,779	24,624	14,320	11,212	6,497	2,044	-	-	-
Total	537,435	-	2,961	5,607	11,748	26,884	56,995	82,886	39,081	59,164	60,775	104,558	77,539	1,574	7,663
Northern white-cedar															
Sawtimber	3,425,244	-	1,508	2,019	14,172	11,142	19,976	29,603	57,211	80,774	94,710	442,637	947,285	814,009	910,198
Poletimber	1,202,922	-	-	-	-	1,782	7,744	11,132	7,206	34,145	23,334	86,338	260,051	330,620	440,570
Sapling-seedling	118,409	767	938	1,526	3,611	8,451	7,019	9,973	15,328	10,797	2,456	25,672	25,370	6,130	371
Total	4,746,575	767	2,446	3,545	17,783	21,375	34,739	50,708	79,745	125,716	120,500	554,647	1,232,706	1,150,759	1,351,139
Tamarack															
Sawtimber	119,276	-	4,962	735	-	10,623	16,690	9,045	22,730	4,077	-	23,597	-	-	26,817
Poletimber	40,562	-	-	-	-	8,115	2,093	2,161	3,296	9,086	1,741	6,136	7,934	-	-
Sapling-seedling	55,828	-	4,527	8,533	3,433	4,693	3,217	4,784	2,400	5,620	-	16,884	1,737	-	-
Total	215,666	-	9,489	9,268	3,433	23,431	22,000	15,990	28,426	18,783	1,741	46,617	9,671	-	26,817

(Table 55 continued on next page)

(Table 55 continued)

Forest type and stand-size class	Basal-area class (square feet per acre)														
	All classes	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121-150	151-180	181+
Oak-hickory															
Sawtimber	7,624,718	4,398	-	11,321	14,977	64,003	111,872	343,942	553,915	708,791	700,708	2,164,805	1,859,258	1,017,295	69,433
Poletimber	1,001,797	-	145	-	1,978	9,748	32,703	81,873	86,235	95,965	178,283	270,133	152,695	88,640	3,399
Sapling-seedling	244,220	592	12,651	21,652	20,323	30,888	68,255	28,593	10,721	2,274	46,314	1,957	-	-	-
Total	8,870,735	4,990	12,796	32,973	37,278	104,639	212,830	454,408	650,871	807,030	925,305	2,436,895	2,011,953	1,105,935	72,832
Elm-ash-soft maple															
Sawtimber	4,500,756	-	-	26,453	44,443	160,190	82,049	99,676	210,026	244,289	334,139	997,176	1,191,113	835,504	275,698
Poletimber	841,791	-	-	6,520	3,973	10,462	43,707	48,740	48,505	53,921	55,669	220,822	221,116	92,196	36,160
Sapling-seedling	264,869	3,260	14,185	11,672	43,333	31,089	26,838	45,036	15,096	36,025	27,399	2,429	8,507	-	-
Total	5,607,416	3,260	14,185	44,645	91,749	201,741	152,594	193,452	273,627	334,235	417,207	1,220,427	1,420,736	927,700	311,858
Maple-birch															
Sawtimber	25,895,727	-	1,406	4,494	19,752	98,931	229,840	378,730	759,533	1,458,216	1,708,695	4,979,791	9,201,288	5,262,784	1,792,267
Poletimber	5,258,747	-	-	2,267	20,930	19,975	76,879	82,486	172,885	290,799	495,070	1,018,305	1,764,047	1,045,152	269,952
Sapling-seedling	1,153,509	2,671	26,141	47,928	82,315	159,477	157,164	199,854	179,348	134,078	121,892	40,984	1,657	-	-
Total	32,307,983	2,671	27,547	54,689	122,997	278,383	463,883	661,070	1,111,766	1,883,093	2,325,657	6,039,080	10,966,992	6,307,936	2,062,219
Aspen															
Sawtimber	5,384,947	-	2,213	-	7,088	31,943	70,375	234,411	356,054	342,262	562,301	1,060,841	1,443,447	864,952	409,060
Poletimber	1,542,608	-	-	392	2,778	15,688	16,633	59,182	89,997	99,470	163,956	355,322	394,524	281,566	63,100
Sapling-seedling	578,948	10,188	17,157	32,770	59,183	105,721	108,434	68,310	50,655	54,257	22,047	49,312	914	-	-
Total	7,506,503	10,188	19,370	33,162	69,049	153,352	195,442	361,903	496,706	495,989	748,304	1,465,475	1,838,885	1,146,518	472,160
Paper birch															
Sawtimber	508,274	-	-	-	-	7,231	-	22,565	9,852	17,672	52,790	106,248	188,476	84,554	18,886
Poletimber	415,359	-	-	-	844	1,745	5,522	4,250	6,039	10,899	40,588	74,519	166,966	79,898	24,089
Sapling-seedling	13,456	266	2,588	-	5,084	-	1,016	-	1,034	2,554	914	-	-	-	-
Total	937,089	266	2,588	-	5,928	8,976	6,538	26,815	16,925	31,125	94,292	180,767	355,442	164,452	42,975
Balsam poplar															
Sawtimber	406,379	-	-	2,878	-	14,850	22,194	35,098	-	17,558	28,783	83,651	143,855	49,778	7,734
Poletimber	111,027	-	-	-	2,405	461	2,432	16,536	-	13,891	7,930	41,718	13,490	6,382	5,782
Sapling-seedling	32,368	-	2,761	9,958	3,560	7,781	1,700	1,150	5,458	-	-	-	-	-	-
All stands	549,774	-	2,761	12,836	5,965	23,092	26,326	52,784	5,458	31,449	36,713	125,369	157,345	56,160	13,516
Nonstocked	4,257	2,095	2,162	-	-	-	-	-	-	-	-	-	-	-	-
All types															
Sawtimber	55,551,050	4,398	15,279	57,007	132,896	487,328	830,870	1,512,915	2,280,808	3,446,234	4,069,726	11,439,701	16,882,713	10,184,829	4,206,346
Poletimber	12,403,526	-	1,328	13,108	39,199	90,321	236,760	414,031	591,816	756,494	1,177,114	2,412,774	3,420,067	2,194,857	1,055,657
Sapling-seedling	3,012,381	29,163	100,032	156,891	275,542	397,287	455,038	428,186	389,422	288,250	259,234	167,079	45,630	20,256	371
Nonstocked	4,257	2,095	2,162	-	-	-	-	-	-	-	-	-	-	-	-
Total	70,971,214	35,656	118,801	227,006	447,637	974,936	1,522,668	2,355,132	3,262,046	4,490,978	5,506,074	14,019,554	20,348,410	12,399,942	5,262,374

[1] International 1/4-inch rule.

Table 56. Net volume of sawtimber on timberland by species group, grade, and Forest Survey Unit, Michigan, 1993
(In thousand board feet)[1]

Eastern Upper Peninsula Unit

Species	Total	Log grade 1	2	3	4
Softwoods					
Jack pine	445,135	-	1,640	443,495	-
Red pine	1,110,683	13,476	35,835	1,061,372	-
White pine	1,070,749	201,314	260,120	405,560	203,755
White spruce	615,977	1,168	13,683	601,126	-
Black spruce	190,646	-	1,995	188,651	-
Balsam fir	457,685	-	-	457,685	-
Hemlock	795,256	48,238	113,228	633,790	-
Tamarack	115,412	-	13,906	101,506	-
Eastern redcedar	-	-	-	-	-
Northern white-cedar	1,823,049	7,606	28,007	1,787,436	-
Other softwoods	15,212	-	-	15,212	-
Total	6,639,804	271,802	468,414	5,695,833	203,755

Species	Total	Tree grade 1	2	3	Tie & timber
Hardwoods					
Select white oak	2,354	-	-	2,354	-
Select red oak	103,325	12,477	37,780	22,690	30,378
Other red oak	-	-	-	-	-
Select hickory	-	-	-	-	-
Other hickory	1,138	-	-	1,138	-
Basswood	178,562	45,313	67,996	61,873	3,380
Beech	736,242	60,609	243,020	263,505	169,108
Yellow birch	341,800	42,561	125,591	143,256	30,392
Hard maple	1,705,093	173,008	586,972	763,981	181,132
Soft maple	1,263,087	85,239	350,576	622,620	204,652
Elm	20,731	-	6,792	13,939	-
Black ash	60,825	2,294	21,022	32,374	5,135
White & green ash	96,002	43,021	18,290	31,607	3,084
Sycamore	-	-	-	-	-
Cottonwood	2,442	-	-	-	2,442
Willow	485	-	-	-	485
Hackberry	-	-	-	-	-
Balsam poplar	371,222	29,486	115,006	156,469	70,261
Bigtooth aspen	187,674	26,628	38,133	97,426	25,487
Quaking aspen	906,866	80,605	272,405	417,696	136,160
Paper birch	354,886	8,884	91,907	209,839	44,256
Tupelo	-	-	-	-	-
Black cherry	123,830	2,477	54,369	60,826	6,158
Black walnut	-	-	-	-	-
Butternut	2,543	-	677	1,866	-
Yellow-poplar	-	-	-	-	-
Sassafras	-	-	-	-	-
Other hardwoods	546	-	145	401	-
Total	6,459,653	612,602	2,030,681	2,903,860	912,510
All species	13,099,457	884,404	2,499,095	8,599,693	1,116,265

Western Upper Peninsula Unit

Species	Total	Log grade 1	2	3	4
Softwoods					
Jack pine	342,139	-	6,789	335,350	-
Red pine	566,657	122,273	32,941	411,443	-
White pine	1,068,936	161,695	297,139	528,244	81,858
White spruce	1,122,092	-	25,210	1,096,882	-
Black spruce	253,541	-	-	253,541	-
Balsam fir	772,432	-	-	772,432	-
Hemlock	1,908,724	28,113	170,664	1,709,947	-
Tamarack	158,854	-	12,715	146,139	-
Eastern redcedar	-	-	-	-	-
Northern white-cedar	1,605,852	-	32,149	1,573,703	-
Other softwoods	3,679	-	-	3,679	-
Total	7,802,906	312,081	577,607	6,831,360	81,858

Species	Total	Tree grade 1	2	3	Tie & timber
Hardwoods					
Select white oak	2,739	-	-	2,739	-
Select red oak	371,090	78,664	113,354	150,210	28,862
Other red oak	-	-	-	-	-
Select hickory	-	-	-	-	-
Other hickory	-	-	-	-	-
Basswood	780,922	141,463	223,562	394,264	21,633
Beech	1,124	204	322	567	31
Yellow birch	983,766	167,822	248,273	529,378	38,293
Hard maple	4,685,546	639,399	1,437,841	2,264,556	343,750
Soft maple	1,560,360	79,902	357,882	985,290	137,286
Elm	115,494	115,494	-	-	-
Black ash	201,125	17,344	68,702	111,163	3,916
White & green ash	123,980	32,370	52,604	39,006	-
Sycamore	-	-	-	-	-
Cottonwood	-	-	-	-	-
Willow	1,856	485	787	584	-
Hackberry	-	-	-	-	-
Balsam poplar	183,199	49,337	58,125	67,815	7,922
Bigtooth aspen	433,431	77,573	139,382	202,987	13,489
Quaking aspen	1,819,235	59,463	317,086	1,263,772	178,914
Paper birch	450,175	16,694	129,579	280,138	23,764
Tupelo	-	-	-	-	-
Black cherry	106,161	3,242	42,169	51,793	8,957
Black walnut	-	-	-	-	-
Butternut	-	-	-	-	-
Yellow-poplar	-	-	-	-	-
Sassafras	-	-	-	-	-
Other hardwoods	-	-	-	-	-
Total	11,820,203	1,479,456	3,189,668	6,344,262	806,817
All species	19,623,109	1,791,537	3,767,275	13,175,622	888,675

(Table 56 continued on the next page)

(Table 56 continued)

Northern Lower Peninsula Unit

Species	Total	Log grade 1	2	3	4
Softwoods					
Jack pine	653,770	3,103	-	650,667	-
Red pine	2,828,944	124,513	167,108	2,537,323	-
White pine	1,396,576	150,692	309,296	738,021	198,567
White spruce	187,725	10,471	23,970	153,284	-
Black spruce	64,714	-	2,675	62,039	-
Balsam fir	248,908	-	10,514	238,394	-
Hemlock	409,481	10,217	35,806	363,458	-
Tamarack	120,545	2,980	5,091	112,474	-
Eastern redcedar	2,666	-	106	2,560	-
Northern white-cedar	1,250,687	-	49,694	1,200,993	-
Other softwoods	110,789	-	-	110,789	-
Total	7,274,805	301,976	604,260	6,170,002	198,567

Species	Total	Tree grade 1	2	3	Tie & timber
Hardwoods					
Select white oak	907,489	75,402	257,849	431,975	142,263
Select red oak	3,289,938	547,704	1,162,142	1,206,011	374,081
Other red oak	579,186	30,560	88,610	274,393	185,623
Select hickory	3,145	166	481	1,490	1,008
Other hickory	3,229	170	494	1,530	1,035
Basswood	1,148,903	188,250	509,486	442,583	8,584
Beech	632,167	102,442	261,551	251,514	16,660
Yellow birch	118,263	14,741	32,558	61,905	9,059
Hard maple	2,192,548	232,304	654,060	1,116,202	189,982
Soft maple	2,620,902	270,837	767,959	1,348,004	234,102
Elm	47,149	16,481	25,981	4,687	-
Black ash	94,748	2,296	37,540	50,390	4,522
White & green ash	830,289	213,794	304,583	297,266	14,646
Sycamore	6,243	1,608	2,290	2,235	110
Cottonwood	70,003	45,504	13,405	8,758	2,336
Willow	30,990	3,759	14,108	7,566	5,557
Hackberry	-	-	-	-	-
Balsam poplar	393,608	61,693	106,789	177,575	47,551
Bigtooth aspen	2,396,019	116,555	731,559	1,351,424	196,481
Quaking aspen	1,882,083	99,611	545,815	1,005,605	231,052
Paper birch	379,474	5,774	78,805	263,593	31,302
Tupelo	1,886	29	392	1,309	156
Black cherry	303,039	56,609	75,586	153,242	17,602
Black walnut	3,703	-	3,703	-	-
Butternut	1,706	-	-	1,706	-
Yellow-poplar	-	-	-	-	-
Sassafras	10,423	-	5,590	4,833	-
Other hardwoods	-	-	-	-	-
Total	17,947,133	2,086,289	5,681,336	8,465,796	1,713,712
All species	25,221,938	2,388,265	6,285,596	14,635,798	1,912,279

[1] International 1/4-inch rule.

Southern Lower Peninsula Unit

Species	Total	Log grade 1	2	3	4
Softwoods					
Jack pine	33,556	-	-	33,556	-
Red pine	285,654	-	-	285,654	-
White pine	437,178	25,364	20,484	330,785	60,545
White spruce	24,342	-	-	24,342	-
Black spruce	-	-	-	-	-
Balsam fir	2,003	-	290	1,713	-
Hemlock	40,551	-	5,876	34,675	-
Tamarack	35,871	-	22,577	13,294	-
Eastern redcedar	2,211	-	-	2,211	-
Northern white-cedar	17,308	-	-	17,308	-
Other softwoods	96,372	-	-	96,372	-
Total	975,046	25,364	49,227	839,910	60,545

Species	Total	Tree grade 1	2	3	Tie & timber
Hardwoods					
Select white oak	1,747,301	325,170	569,874	655,556	196,701
Select red oak	1,749,079	398,618	462,392	533,336	354,733
Other red oak	740,840	129,416	225,124	229,675	156,625
Select hickory	268,263	38,409	77,533	101,769	50,552
Other hickory	173,800	31,764	48,636	56,219	37,181
Basswood	396,138	136,601	144,253	115,284	-
Beech	307,418	88,249	100,463	101,362	17,344
Yellow birch	29,342	-	3,892	20,711	4,739
Hard maple	699,733	303,208	177,106	171,030	48,389
Soft maple	2,264,189	767,385	583,327	677,993	235,484
Elm	248,094	11,799	49,029	163,200	24,066
Black ash	118,519	-	51,290	63,359	3,870
White & green ash	1,164,386	307,010	417,129	356,020	84,227
Sycamore	101,445	26,488	36,332	32,590	6,035
Cottonwood	447,716	93,142	101,562	201,283	51,729
Willow	124,439	5,020	45,854	48,051	25,514
Hackberry	7,544	1,198	2,176	2,960	1,210
Balsam poplar	29,464	6,734	3,970	15,105	3,655
Bigtooth aspen	276,641	-	45,743	127,472	103,426
Quaking aspen	128,374	13,499	11,173	64,121	39,581
Paper birch	24,655	-	-	24,655	-
Tupelo	9,385	-	-	9,385	-
Black cherry	554,057	76,641	167,670	283,032	26,714
Black walnut	157,291	31,645	71,144	49,118	5,384
Butternut	22,990	-	19,167	3,823	-
Yellow-poplar	162,735	27,454	86,263	44,381	4,637
Sassafras	59,319	8,289	11,602	39,428	-
Other hardwoods	38,507	4,502	7,426	24,643	1,936
Total	12,051,664	2,832,241	3,520,130	4,215,561	1,483,732
All species	13,026,710	2,857,605	3,569,357	5,055,471	1,544,277

(Table 56 continued on the next page)

(Table 56 continued)

All Units

Species	Total	Log grade 1	2	3	4
Softwoods					
Jack pine	1,474,600	3,103	8,429	1,463,068	-
Red pine	4,791,938	260,262	235,884	4,295,792	-
White pine	3,973,439	539,065	887,039	2,002,610	544,725
White spruce	1,950,136	11,639	62,863	1,875,634	-
Black spruce	508,901	-	4,670	504,231	-
Balsam fir	1,481,028	-	10,804	1,470,224	-
Hemlock	3,154,012	86,568	325,574	2,741,870	-
Tamarack	430,682	2,980	54,289	373,413	-
Eastern redcedar	4,877	-	106	4,771	-
Northern white-cedar	4,696,896	7,606	109,850	4,579,440	-
Other softwoods	226,052	-	-	226,052	-
Total	22,692,561	911,223	1,699,508	19,537,105	544,725

Species	Total	Tree grade 1	2	3	Tie & timber
Hardwoods					
Select white oak	2,659,883	400,572	827,723	1,092,624	338,964
Select red oak	5,513,432	1,037,463	1,775,668	1,912,247	788,054
Other red oak	1,320,026	159,976	313,734	504,068	342,248
Select hickory	271,408	38,575	78,014	103,259	51,560
Other hickory	178,167	31,934	49,130	58,887	38,216
Basswood	2,504,525	511,627	945,297	1,014,004	33,597
Beech	1,676,951	251,504	605,356	616,948	203,143
Yellow birch	1,473,171	225,124	410,314	755,250	82,483
Hard maple	9,282,920	1,347,919	2,855,979	4,315,769	763,253
Soft maple	7,708,538	1,203,363	2,059,744	3,633,907	811,524
Elm	431,468	143,774	81,802	181,826	24,066
Black ash	475,217	21,934	178,554	257,286	17,443
White & green ash	2,214,657	596,195	792,606	723,899	101,957
Sycamore	107,688	28,096	38,622	34,825	6,145
Cottonwood	520,161	138,646	114,967	210,041	56,507
Willow	157,770	9,264	60,749	56,201	31,556
Hackberry	7,544	1,198	2,176	2,960	1,210
Balsam poplar	977,493	147,250	283,890	416,964	129,389
Bigtooth aspen	3,293,765	220,756	954,817	1,779,309	338,883
Quaking aspen	4,736,558	253,178	1,146,479	2,751,194	585,707
Paper birch	1,209,190	31,352	300,291	778,225	99,322
Tupelo	11,271	29	392	10,694	156
Black cherry	1,087,087	138,969	339,794	548,893	59,431
Black walnut	160,994	31,645	74,847	49,118	5,384
Butternut	27,239	-	19,844	7,395	-
Yellow-poplar	162,735	27,454	86,263	44,381	4,637
Sassafras	69,742	8,289	17,192	44,261	-
Other hardwoods	39,053	4,502	7,571	25,044	1,936
Total	48,278,653	7,010,588	14,421,815	21,929,479	4,916,771
All species	70,971,214	7,921,811	16,121,323	41,466,584	5,461,496

Table 57. -- Net volume of short-log trees (cull volume) in cubic feet on timberland by species group and diameter class, Michigan, 1993

(In thousand cubic feet)

Species group	Total	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods									
Jack pine	5,699	2,260	1,647	834	958	-	-	-	-
Red pine	4,068	1,625	768	897	142	510	-	126	-
White pine	16,002	2,103	2,629	2,517	2,605	1,030	1,615	2,918	585
White spruce	2,027	415	622	393	-	420	-	177	-
Black spruce	271	271	-	-	-	-	-	-	-
Balsam fir	2,829	539	886	1,220	-	184	-	-	-
Hemlock	19,337	2,777	4,751	3,358	3,439	1,356	2,026	1,510	120
Tamarack	1,812	509	983	147	173	-	-	-	-
Eastern redcedar	161	161	-	-	-	-	-	-	-
Northern white-cedar	45,798	10,119	14,653	8,445	5,316	3,882	1,675	1,708	-
Other softwoods	1,769	887	802	80	-	-	-	-	-
Total softwoods	99,773	21,666	27,741	17,891	12,633	7,382	5,316	6,439	705
Hardwoods									
Select white oak	30,011	-	2,109	4,417	3,492	3,896	3,155	9,271	3,671
Select red oak	43,204	-	5,921	8,111	7,211	2,446	4,440	9,658	5,417
Other red oak	14,408	-	2,347	2,948	1,353	1,504	1,836	1,508	2,912
Select hickory	659	-	196	-	222	-	241	-	-
Other hickory	1,166	-	-	-	-	674	-	492	-
Basswood	12,337	-	4,283	3,392	1,712	780	203	1,695	272
Beech	24,980	-	1,200	5,078	5,159	3,076	2,260	7,894	313
Yellow birch	37,615	-	5,754	9,528	6,044	5,265	3,470	6,013	1,541
Hard maple	87,974	-	16,317	18,980	16,881	11,790	7,799	11,463	4,744
Soft maple	98,395	-	12,478	20,778	17,568	14,404	7,689	15,421	10,057
Elm	6,326	-	2,245	640	1,486	625	-	1,330	-
Black ash	2,103	-	1,154	678	271	-	-	-	-
White & green ash	18,854	-	4,427	4,563	2,739	1,915	765	1,914	2,531
Cottonwood	994	-	-	-	531	-	-	247	216
Willow	4,420	-	221	719	813	152	263	2,252	-
Balsam poplar	1,842	-	829	493	246	-	274	-	-
Bigtooth aspen	13,071	-	1,072	3,420	2,699	2,145	1,042	2,421	272
Quaking aspen	34,440	-	5,464	7,467	8,593	6,011	3,618	3,287	-
Paper birch	16,160	-	5,363	4,618	2,420	1,526	470	1,642	121
Black cherry	26,555	-	4,091	8,837	4,259	4,506	1,926	2,936	-
Black walnut	1,512	-	-	162	-	167	-	725	458
Butternut	561	-	-	-	-	-	-	561	-
Yellow-poplar	468	-	-	-	-	-	-	-	468
Sassafras	588	-	-	398	-	190	-	-	-
Other hardwoods	2,853	-	1,475	253	738	119	268	-	-
Noncommercial species	95	-	95	-	-	-	-	-	-
Total hardwoods	481,591	-	77,041	105,480	84,437	61,191	39,719	80,730	32,993
All species	581,364	21,666	104,782	123,371	97,070	68,573	45,035	87,169	33,698

Table 58. -- Net volume of short-log trees (cull volume) in board feet[1] on timberland by species group and diameter class, Michigan, 1993

(In thousand board feet)

Species group	Total	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
Softwoods									
Jack pine	18,942	7,249	5,416	2,879	3,398	-	-	-	-
Red pine	15,048	5,815	2,800	3,361	542	2,009	-	521	-
White pine	53,841	6,373	8,141	8,023	8,765	3,582	5,786	10,865	2,306
White spruce	10,014	1,923	3,005	1,949	-	2,186	-	951	-
Black spruce	859	859	-	-	-	-	-	-	-
Balsam fir	8,211	1,492	2,517	3,616	-	586	-	-	-
Hemlock	54,830	7,395	12,728	9,288	9,935	4,038	6,209	4,820	417
Tamarack	7,440	2,025	4,016	630	769	-	-	-	-
Eastern redcedar	727	727	-	-	-	-	-	-	-
Northern white-cedar	160,795	34,116	50,117	29,784	19,255	14,423	6,381	6,719	-
Other softwoods	7,674	3,778	3,533	363	-	-	-	-	-
Total softwoods	338,381	71,752	92,273	59,893	42,664	26,824	18,376	23,876	2,723
Hardwoods									
Select white oak	74,910	-	4,525	9,999	8,322	9,513	7,922	24,378	10,251
Select red oak	92,622	-	10,921	16,124	14,968	5,272	9,760	22,263	13,314
Other red oak	32,440	-	4,574	6,187	2,966	3,389	4,254	3,666	7,404
Select hickory	1,510	-	402	-	512	-	596	-	-
Other hickory	2,945	-	-	-	-	1,607	-	1,338	-
Basswood	24,743	-	7,858	6,768	3,546	1,659	442	3,818	652
Beech	65,736	-	2,824	12,493	13,154	8,122	6,106	22,106	931
Yellow birch	90,275	-	12,429	21,864	14,426	12,965	8,746	15,646	4,199
Hard maple	197,082	-	32,589	40,549	37,844	27,216	18,482	28,145	12,257
Soft maple	251,195	-	27,533	49,799	44,013	37,187	20,405	42,610	29,648
Elm	15,466	-	4,969	1,543	3,695	1,610	-	3,649	-
Black ash	4,669	-	2,492	1,532	645	-	-	-	-
White & green ash	40,446	-	8,461	9,269	5,824	4,213	1,741	4,544	6,394
Cottonwood	3,307	-	-	-	1,611	-	-	878	818
Willow	14,674	-	610	2,087	2,491	495	878	8,113	-
Balsam poplar	4,358	-	1,842	1,190	606	-	720	-	-
Bigtooth aspen	21,964	-	1,618	5,491	4,473	3,689	1,826	4,360	507
Quaking aspen	73,285	-	10,504	15,400	18,401	13,177	8,123	7,680	-
Paper birch	38,065	-	11,777	10,792	5,846	3,810	1,199	4,306	335
Black cherry	59,504	-	8,266	19,225	9,634	10,479	4,604	7,296	-
Black walnut	3,851	-	-	366	-	404	-	1,865	1,216
Butternut	1,444	-	-	-	-	-	-	1,444	-
Yellow-poplar	1,236	-	-	-	-	-	-	-	1,236
Sassafras	1,730	-	-	1,147	-	583	-	-	-
Other hardwoods	8,025	-	3,884	737	2,195	363	846	-	-
Noncommercial species	242	-	242	-	-	-	-	-	-
Total hardwoods	1,125,724	-	158,320	232,562	195,172	145,753	96,650	208,105	89,162
All species	1,464,105	71,752	250,593	292,455	237,836	172,577	115,026	231,981	91,885

[1]International 1/4-inch rule.

Table 59. -- Current annual growth of growing stock and sawtimber on timberland, 1979 and 1992, and average net annual growth of growing stock and sawtimber, 1980-1992 by softwoods and hardwoods and Forest Survey Unit, Michigan

Forest Survey Unit and softwoods and hardwoods	Growing stock			Sawtimber		
	Current annual growth	Average net annual growth	Current annual growth	Current annual growth	Average net annual growth	Current annual growth
	1979	1980-1992	1992	1979	1980-1992	1992
	(In thousand cubic feet)			*(In thousand board feet)* [1]		
Eastern Upper Peninsula						
Softwoods	45,092	63,237	67,262	131,311	242,504	271,338
Hardwoods	61,935	68,611	75,607	164,302	223,532	272,061
Total	107,027	131,848	142,869	295,613	466,036	543,399
Western Upper Peninsula						
Softwoods	41,931	49,952	57,226	183,905	231,828	264,022
Hardwoods	111,777	116,245	125,361	308,295	390,096	448,721
Total	153,708	166,197	182,587	492,200	621,924	712,743
Northern Lower Peninsula						
Softwoods	67,397	102,443	109,861	151,350	323,163	420,362
Hardwoods	174,595	211,903	232,893	494,067	738,215	852,390
Total	241,992	314,346	342,754	645,417	1,061,378	1,272,752
Southern Lower Peninsula						
Softwoods	11,362	12,580	14,667	29,018	50,302	59,701
Hardwoods	90,766	135,444	142,133	291,841	465,548	486,444
Total	102,128	148,024	156,800	320,859	515,850	546,145
All Units						
Softwoods	165,782	228,212	249,016	495,584	847,797	1,015,423
Hardwoods	439,073	532,203	575,994	1,258,505	1,817,391	2,059,616
Total	604,855	760,415	825,010	1,754,089	2,665,188	3,075,039

[1] International 1/4-inch rule.

Table 60. -- Average net annual growth of growing stock on timberland by species group and ownership class, Michigan, 1980-1992

(In thousand cubic feet)

Species group	Total	Ownership class							
		National forest	Other federal	State	County & municipal	Indian	Forest industry	Individual	Corporate
Softwoods									
Jack pine	12,211	3,889	316	4,717	387	-	169	1,910	823
Red pine	78,310	25,196	182	21,847	2,080	-	797	23,873	4,335
White pine	32,518	5,041	86	7,576	477	-	1,572	14,149	3,617
White spruce	19,649	3,736	137	2,972	147	22	2,153	8,162	2,320
Black spruce	3,410	323	2	1,035	77	3	516	1,053	401
Balsam fir	12,484	307	130	2,445	45	10	1,172	6,532	1,843
Hemlock	12,256	1,640	41	1,392	122	15	2,828	4,156	2,062
Tamarack	4,481	548	-	1,039	17	-9	554	1,706	626
Eastern redcedar	230	-	-	27	-	-	-	184	19
Northern white-cedar	46,202	5,139	54	12,088	425	59	5,531	18,623	4,283
Other softwoods	6,461	45	-	162	122	-	-	5,738	394
Total softwoods	228,212	45,864	948	55,300	3,899	100	15,292	86,086	20,723
Hardwoods									
Select white oak	18,733	2,198	-	2,941	521	-	102	11,099	1,872
Other white oak	25	-	-	-	-	-	-	25	-
Select red oak	44,236	4,323	43	9,053	547	-	666	24,945	4,659
Other red oak	10,180	1,791	31	1,301	78	-	-	6,343	636
Select hickory	1,965	-	-	112	97	-	-	1,618	138
Other hickory	1,691	-	-	241	9	-	-	1,291	150
Basswood	20,084	1,923	-	3,665	301	42	1,570	10,183	2,400
Beech	13,694	1,388	165	1,856	155	-	1,058	6,859	2,213
Yellow birch	4,448	232	133	612	83	21	1,113	1,436	818
Hard maple	113,964	13,362	168	15,922	1,608	136	18,967	48,880	14,921
Soft maple	108,225	11,039	232	17,672	1,358	100	7,481	58,390	11,953
Elm	7,415	-1,686	-6	84	35	-63	-1,006	10,260	-203
Black ash	8,383	760	-	1,477	185	47	326	4,772	816
White & green ash	33,068	837	7	2,753	606	-	689	24,509	3,667
Sycamore	456	-	-	-	-	-	-	449	7
Cottonwood	5,224	-84	-	301	169	-	-	4,182	656
Willow	773	9	-	113	-27	-	-	549	129
Hackberry	173	-	-	-	-	-	-	173	-
Balsam poplar	6,181	602	-	1,148	-16	22	477	3,806	142
Bigtooth aspen	40,817	3,444	69	10,578	532	8	329	21,631	4,226
Quaking aspen	57,148	5,008	270	11,218	566	55	4,006	29,691	6,334
Paper birch	13,196	730	77	3,214	173	8	718	6,438	1,838
Tupelo	293	-	-	30	-	-	-	263	-
Black cherry	14,445	915	19	1,698	193	-	329	9,688	1,603
Black walnut	1,758	-	-	137	63	-	-	1,488	70
Butternut	195	-	-	-	-	-	-	162	33
Yellow-poplar	1,332	-	-	64	9	-	-	1,274	-15
Sassafras	2,191	6	-	452	43	-	-	1,632	58
Other hardwoods	1,910	-	2	21	72	-	5	1,543	267
Total hardwoods	532,203	46,797	1,210	86,663	7,360	376	36,830	293,579	59,388
All species	760,415	92,661	2,158	141,963	11,259	476	52,122	379,665	80,111

Table 61. -- Average net annual growth of sawtimber on timberland by species group and ownership class, Michigan, 1980-1992

(In thousand board feet)[1]

Species group	Total	Ownership class							
		National forest	Other federal	State	County & municipal	Indian	Forest industry	Individual	Corporate
Softwoods									
Jack pine	55,552	14,938	1,089	24,118	1,629	-	886	9,446	3,446
Red pine	242,699	90,044	736	72,011	5,030	-	1,442	62,315	11,121
White pine	157,432	22,744	219	36,479	2,374	-	8,761	67,471	19,384
White spruce	80,833	15,819	681	12,630	1,063	112	10,187	27,849	12,492
Black spruce	5,797	-557	6	3,195	151	-	834	1,042	1,126
Balsam fir	46,338	3,475	512	9,145	208	9	3,954	20,833	8,202
Hemlock	70,789	11,114	252	7,973	743	101	16,577	22,258	11,771
Tamarack	16,116	2,128	-	3,576	233	-	1,985	5,774	2,420
Eastern redcedar	409	-	-	-	-	-	-	409	-
Northern white-cedar	154,262	20,684	166	39,648	1,450	84	20,709	55,255	16,266
Other softwoods	17,570	228	-	314	484	-	-	15,561	983
Total softwoods	847,797	180,617	3,661	209,089	13,365	306	65,335	288,213	87,211
Hardwoods									
Select white oak	82,414	8,337	-	10,685	2,265	-	458	52,708	7,961
Select red oak	209,222	19,806	179	42,581	3,224	-	2,918	117,819	22,695
Other red oak	44,620	8,736	-	4,947	469	-	-	27,132	3,336
Select hickory	7,286	-	-	503	545	-	-	5,456	782
Other hickory	6,708	-	-	916	58	-	-	5,171	563
Basswood	88,004	9,950	-	17,443	684	197	5,712	45,034	8,984
Beech	54,064	6,221	738	5,460	533	-	4,838	27,322	8,952
Yellow birch	18,897	3,614	587	1,585	-42	185	3,870	6,369	2,729
Hard maple	325,416	38,309	515	37,188	4,520	513	56,456	142,483	45,432
Soft maple	313,574	32,037	264	43,315	4,135	286	21,703	178,764	33,070
Elm	11,101	-3,926	-27	-308	119	-206	-1,744	18,119	-926
Black ash	13,625	1,752	-	1,481	332	1	909	7,353	1,797
White & green ash	110,735	2,470	38	7,898	1,929	-	1,777	83,720	12,903
Sycamore	2,735	-	-	-	-	-	-	2,696	39
Cottonwood	24,403	-466	-	929	938	-	-	20,218	2,784
Willow	3,906	-	-	707	100	-	-	2,795	304
Hackberry	301	-	-	-	-	-	-	301	-
Balsam poplar	21,811	1,109	-	5,010	94	5	1,378	13,487	728
Bigtooth aspen	162,687	10,289	343	37,901	2,806	68	1,241	91,056	18,983
Quaking aspen	207,715	25,298	1,542	35,940	2,376	250	14,192	100,388	27,729
Paper birch	41,988	1,824	201	10,740	227	-	3,839	18,867	6,290
Tupelo	713	-	-	64	-	-	-	649	-
Black cherry	44,469	4,373	94	4,757	776	-	1,478	28,507	4,484
Black walnut	6,549	-	-	261	-	-	-	6,024	264
Butternut	954	1	-	-	-	-	-	870	83
Yellow-poplar	6,036	-	-	333	48	-	-	5,715	-60
Sassafras	4,451	-	-	382	-	-	-	3,908	161
Other hardwoods	3,007	-	11	-	429	-	-	2,594	-27
Total hardwoods	1,817,391	169,734	4,485	270,718	26,565	1,299	119,025	1,015,525	210,040
All species	2,665,188	350,351	8,146	479,807	39,930	1,605	184,360	1,303,738	297,251

[1]International 1/4-inch rule.

Table 62. -- Average net annual growth of growing stock on timberland by species group and forest type, Michigan, 1980-1992

(In thousand cubic feet)

Species group	All types	Forest type														
		Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar	Tamarack	Oak-hickory	Elm-ash-soft maple	Maple-beech-birch	Aspen	Paper birch	Balsam poplar	Non-stocked
Softwoods																
Jack pine	12,211	10,078	423	-14	81	70	441	3	-10	607	-81	151	398	2	-	62
Red pine	78,310	3,548	63,677	836	365	193	313	87	1	2,440	242	2,990	3,254	325	9	30
White pine	32,518	1,109	3,073	8,632	1,275	342	775	1,592	84	2,737	640	8,951	2,777	497	34	-
White spruce	19,649	192	582	165	2,966	4,907	834	-15	62	287	676	4,192	4,120	413	257	11
Black spruce	3,410	96	9	-105	584	107	3,465	-1,520	62	-21	66	236	413	-	18	-
Balsam fir	12,484	78	168	81	4,715	96	521	-2,009	63	140	624	2,403	4,093	991	519	1
Hemlock	12,256	-	94	72	166	7	43	356	1	99	684	10,287	312	118	17	-
Tamarack	4,481	17	43	3	305	40	1,020	761	1,686	7	82	128	229	55	104	1
Eastern redcedar	230	-	-	-	-	-	-	-	-	118	-	112	-	-	-	-
Northern white-cedar	46,202	12	75	54	1,595	195	712	31,695	461	48	3,028	4,319	2,374	995	606	33
Other softwoods	6,461	4,523	409	123	52	112	6	41	-	168	50	887	75	15	-	-
Total softwoods	228,212	19,653	68,553	9,847	12,104	6,069	8,130	30,991	2,410	6,630	6,011	34,656	18,045	3,411	1,564	138
Hardwoods																
Select white oak	18,733	80	327	101	-	-	-	6	1	13,283	1,252	3,101	547	35	-	-
Other white oak	25	-	-	-	-	-	-	-	-	-	25	-	-	-	-	-
Select red oak	44,236	522	718	278	54	35	-	41	5	27,683	713	9,666	4,372	133	16	-
Other red oak	10,180	276	305	176	-	-	-	-	-	7,242	371	1,448	353	-	9	-
Select hickory	1,965	23	-	-	-	-	-	-	-	1,080	51	809	2	-	-	-
Other hickory	1,691	92	17	-	-	-	-	-	-	692	37	853	-	-	-	-
Basswood	20,084	85	26	9	28	-	-	16	-	607	832	17,785	705	-3	-6	-
Beech	13,694	-	-3	-10	20	-	-	-	-	274	82	13,082	249	-	-	-
Yellow birch	4,448	-	11	35	-5	17	4	-151	-	24	2	4,159	309	46	-3	-
Hard maple	113,964	124	398	162	338	66	23	270	-	760	704	107,153	3,398	524	44	-
Soft maple	108,225	317	1,117	479	1,217	246	222	1,479	100	8,088	23,977	58,559	10,925	1,400	99	-
Elm	7,415	23	24	-8	-103	-51	-18	-106	62	845	3,918	2,834	-5	44	-44	-
Black ash	8,383	-	-	19	236	15	7	145	1	83	4,920	2,116	630	29	182	-
White & green ash	33,068	29	164	8	37	7	-	221	14	1,497	9,129	20,500	1,265	169	28	-
Sycamore	456	-	-	-	-	-	-	-	-	16	337	103	-	-	-	-
Cottonwood	5,224	13	-	-	-	-	-	5	-	227	3,297	1,538	120	10	14	-
Willow	773	-	7	-	-	3	-	-	-	22	444	230	53	5	9	-
Hackberry	173	-	-	-	-	-	-	-	-	53	52	68	-	-	-	-
Balsam poplar	6,181	212	47	-46	112	54	97	-261	45	64	246	441	1,936	350	2,884	-
Bigtooth aspen	40,817	133	706	366	131	1	31	16	-1	4,726	825	8,223	25,184	392	84	-
Quaking aspen	57,148	651	787	300	1,896	733	832	-312	-12	1,095	1,548	11,384	36,925	788	521	12
Paper birch	13,196	73	75	162	887	415	190	68	100	338	468	2,918	3,889	3,557	56	-
Tupelo	293	-	-	-	-	-	-	-	-	90	139	34	17	13	-	-
Black cherry	14,445	379	264	84	75	-45	14	37	28	1,916	992	9,775	897	19	10	-
Black walnut	1,758	-	4	-	-	-	-	-	-	816	47	891	-	-	-	-
Butternut	195	-	-	-	-	-	-	9	-	88	11	87	-	-	-	-
Yellow-poplar	1,332	33	4	-	-	-	-	-	-	75	178	1,042	-	-	-	-
Sassafras	2,191	67	-	-	-	-	-	-	-	564	-20	1,552	28	-	-	-
Other hardwoods	1,910	-	43	-	5	-	-	-3	-	201	702	918	44	-	-	-
Total hardwoods	532,203	3,132	5,041	2,115	4,928	1,496	1,402	1,480	343	72,449	55,279	281,269	91,843	7,511	3,903	12
All species	760,415	22,785	73,594	11,962	17,032	7,565	9,532	32,471	2,753	79,079	61,290	315,925	109,888	10,922	5,467	150

Table 63. -- Average net annual growth of sawtimber on timberland by species group and forest type, Michigan, 1980-1992

(In thousand board feet)[1]

Species group	All types	Forest type														
		Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar	Tamarack	Oak-hickory	Elm-ash-soft maple	Maple-beech-birch	Aspen	Paper birch	Balsam poplar	Non-stocked
Softwoods																
Jack pine	55,552	41,439	4,948	653	243	353	1,364	-	-29	3,325	402	818	1,549	38	-	449
Red pine	242,699	14,211	185,248	4,910	1,709	275	1,435	604	5	8,515	1,312	11,827	11,805	573	53	217
White pine	157,432	3,051	15,216	42,579	7,164	2,104	4,226	9,042	634	10,077	3,771	43,591	13,213	2,601	163	-
White spruce	80,833	659	3,113	904	15,399	10,272	4,442	-296	215	376	2,922	20,239	19,424	1,948	1,216	-
Black spruce	5,797	29	-35	213	1,534	292	5,156	-3,780	59	-66	456	891	698	223	127	-
Balsam fir	46,338	206	513	458	13,369	273	2,510	-3,570	299	114	3,014	8,614	15,092	2,951	2,495	-
Hemlock	70,789	-	425	288	676	40	214	2,080	-	464	3,590	60,457	1,441	951	163	-
Tamarack	16,116	36	285	-15	1,136	149	2,720	2,654	5,859	-	864	1,142	482	223	581	-
Eastern redcedar	409	-	-	-	-	-	-	-	-	304	-	105	-	-	-	-
Northern white-cedar	154,262	19	204	740	6,936	673	1,759	95,141	1,023	73	11,646	20,912	8,764	3,662	2,677	33
Other softwoods	17,570	9,771	1,801	118	410	737	-	-	-	538	218	3,501	402	74	-	-
Total softwoods	847,797	69,421	211,718	50,848	48,576	15,168	23,826	101,875	8,065	23,720	28,195	172,097	72,870	13,244	7,475	699
Hardwoods																
Select white oak	82,414	291	1,128	786	-	-	-	-	-	58,402	5,749	14,205	1,639	214	-	-
Select red oak	209,222	2,470	3,410	1,847	157	18	-	-	29	133,612	3,118	45,614	17,729	1,137	81	-
Other red oak	44,620	1,065	1,762	534	-	-	-	-	-	33,413	1,413	5,190	1,197	-	46	-
Select hickory	7,286	-	-	-	-	-	-	-	-	4,101	242	2,943	-	-	-	-
Other hickory	6,708	376	-	-	-	-	-	-	-	3,141	170	3,021	-	-	-	-
Basswood	88,004	350	66	19	255	-	-	298	-	2,094	2,320	80,268	2,353	-19	-	-
Beech	54,064	-	59	-	91	-	-	-	-	1,141	548	51,353	872	-	-	-
Yellow birch	18,897	3	37	-8	248	86	-34	161	3	68	294	17,572	438	-11	40	-
Hard maple	325,416	190	675	753	422	150	-	572	-	2,034	1,004	313,789	4,791	887	149	-
Soft maple	313,574	305	2,004	576	2,006	375	290	5,232	99	20,525	82,074	174,091	22,232	3,304	461	-
Elm	11,101	123	-63	-	-272	-45	-	-324	38	1,031	5,665	4,933	152	17	-154	-
Black ash	13,625	-	-	93	125	-	-	105	-	-	7,269	4,787	976	58	212	-
White & green ash	110,735	133	826	23	-	13	-	470	-	4,864	25,915	75,041	2,941	403	106	-
Sycamore	2,735	-	-	-	-	-	-	-	-	91	1,855	789	-	-	-	-
Cottonwood	24,403	50	-	-	-	-	-	33	-	1,058	15,281	7,535	375	-	71	-
Willow	3,906	-	-	-	-	14	-	-	-	-84	3,076	854	21	25	-	-
Hackberry	301	-	-	-	-	-	-	-	-	-	176	125	-	-	-	-
Balsam poplar	21,811	685	161	-160	989	218	55	703	64	214	464	1,958	5,828	1,289	9,343	-
Bigtooth aspen	162,687	354	2,397	851	587	86	142	-27	25	20,540	2,756	33,775	98,144	2,930	127	-
Quaking aspen	207,715	1,166	1,900	1,595	5,941	2,076	801	-551	35	3,755	9,981	48,652	125,345	4,671	2,348	-
Paper birch	41,988	185	352	533	2,056	480	582	1,809	127	542	3,768	11,759	10,517	9,091	187	-
Tupelo	713	-	-	-	-	-	-	-	-	407	242	-	-	64	-	-
Black cherry	44,469	178	217	5	280	63	-	80	54	7,147	1,560	33,070	1,682	36	97	-
Black walnut	6,549	-	55	-	-	-	-	-	-	3,288	253	2,953	-	-	-	-
Butternut	954	-	-	-	-	-	-	45	-	364	-21	566	-	-	-	-
Yellow-poplar	6,036	162	-	-	-	-	-	-	-	465	719	4,690	-	-	-	-
Sassafras	4,451	-	-	-	-	-	-	-	-	1,331	396	2,670	54	-	-	-
Other hardwoods	3,007	-	-	-	-	-	-	-29	-	161	1,144	1,731	-	-	-	-
Total hardwoods	1,817,391	8,086	14,986	7,447	12,885	3,534	1,836	8,577	474	303,705	177,431	943,934	297,286	24,096	13,114	-
All species	2,665,188	77,507	226,704	58,295	61,461	18,702	25,662	110,452	8,539	327,425	205,626	1,116,031	370,156	37,340	20,589	699

[1] International 1/4-inch rule.

Table 64. -- Current net annual growth, current annual mortality, and current annual removals of growing stock and sawtimber on timberland by species group, Michigan, 1992

Species group	Growing stock			Sawtimber		
	Current net annual growth[1]	Current annual mortality	Current annual removals[2]	Current net annual growth[1]	Current annual mortality	Current annual removals[2]
	1992	1992	1992	1992	1992	1992
	(In thousand cubic feet)			*(In thousand board feet)* [3]		
Softwoods						
Jack pine	10,995	12,803	25,520	52,687	30,681	66,122
Red pine	82,601	336	23,669	327,633	2,421	111,035
White pine	37,266	1,317	5,948	181,389	6,995	28,795
White spruce	26,045	4,538	4,070	115,469	19,653	11,066
Black spruce	3,604	8,791	2,833	6,349	14,673	7,329
Balsam fir	18,031	23,607	7,979	62,869	42,765	20,196
Hemlock	12,964	2,658	3,438	72,106	10,539	10,963
Tamarack	4,933	1,844	719	20,237	3,831	1,799
Eastern redcedar	275	1	-	427	9	-
Northern white-cedar	45,076	2,133	9,949	153,686	13,810	25,633
Other softwoods	7,226	55	485	22,571	131	1,291
Total softwoods	249,016	58,083	84,610	1,015,423	145,508	284,229
Hardwoods						
Select white oak	20,886	100	6,212	89,497	1,393	22,256
Other white oak	25	-	-	-	-	-
Select red oak	43,554	8,653	23,560	213,898	19,194	97,071
Other red oak	10,039	2,652	5,227	45,993	6,638	22,492
Select hickory	2,075	358	119	8,593	1,042	627
Other hickory	1,625	265	292	6,007	595	1,630
Basswood	19,923	4,940	8,012	87,619	14,360	31,937
Beech	14,117	993	5,342	60,033	4,002	21,039
Yellow birch	4,231	7,415	3,584	14,026	24,369	14,282
Hard maple	117,018	12,319	42,370	372,909	27,949	169,112
Soft maple	114,759	14,153	35,938	350,782	28,363	94,327
Elm	17,159	6,395	1,043	37,818	13,878	2,113
Black ash	9,757	3,536	2,268	15,726	4,721	7,523
White & green ash	38,385	2,970	4,229	130,183	4,209	17,892
Sycamore	569	74	179	3,090	350	888
Cottonwood	4,536	624	1,080	22,944	2,642	4,992
Willow	1,191	160	123	3,990	522	126
Hackberry	120	24	420	186	27	2,088
Balsam poplar	7,885	7,775	6,139	36,757	20,966	10,090
Bigtooth aspen	44,178	16,914	46,591	178,591	45,081	116,246
Quaking aspen	67,327	38,478	62,331	252,072	83,796	133,445
Paper birch	14,053	10,159	15,690	52,702	16,029	29,725
Tupelo	311	37	-	623	59	-
Black cherry	14,933	2,178	3,747	53,707	2,669	10,452
Black walnut	1,570	150	499	6,270	385	2,667
Butternut	295	22	43	1,901	68	211
Yellow-poplar	1,086	92	395	4,855	347	1,963
Sassafras	2,477	564	175	4,760	698	304
Other hardwoods	1,910	291	259	4,084	346	878
Total hardwoods	575,994	142,291	275,867	2,059,616	324,698	816,376
All species	825,010	200,374	360,477	3,075,039	470,206	1,100,605

[1] An estimate of current gross growth may be computed by adding current mortality to current net growth.

[2] Based on data from a 1992 mill survey (in process), a logging utilization study (in process), and land-use change estimates from the new inventory.

[3] International 1/4-inch rule.

Table 65. -- Current annual removals for 1979 and 1992, and average annual removals for 1980-1992 from growing stock and sawtimber on timberland by softwoods and hardwoods and Forest Survey Unit, Michigan

Forest Survey Unit and softwoods and hardwoods	Growing stock			Sawtimber		
	Current annual removals 1979 [1]	Average annual removals 1980-1992 [2]	Current annual removals 1992 [1]	Current annual removals 1979 [1]	Average annual removals 1980-1992 [2]	Current annual removals 1992 [1]
	(In thousand cubic feet)			*(In thousand board feet)* [3]		
Eastern Upper Peninsula						
Softwoods	21,146	24,255	26,979	58,426	64,664	76,740
Hardwoods	33,352	30,707	45,281	113,880	85,321	106,384
Total	54,498	54,962	72,260	172,306	149,985	183,124
Western Upper Peninsula						
Softwoods	18,003	20,896	23,142	58,186	78,477	64,569
Hardwoods	60,299	61,634	87,108	185,622	185,883	233,577
Total	78,302	82,530	110,250	243,808	264,360	298,146
Northern Lower Peninsula						
Softwoods	15,249	26,446	32,427	44,278	62,766	132,388
Hardwoods	89,275	75,472	114,824	281,006	176,976	354,145
Total	104,524	101,918	147,251	325,284	239,742	486,533
Southern Lower Peninsula						
Softwoods	1,969	4,538	2,062	4,303	16,893	10,532
Hardwoods	35,303	30,368	28,654	169,812	105,541	122,270
Total	37,272	34,906	30,716	174,115	122,434	132,802
All Units						
Softwoods	56,367	76,135	84,610	165,193	222,800	284,229
Hardwoods	218,229	198,181	275,867	750,320	553,721	816,376
Total	274,596	274,316	360,477	915,513	776,521	1,100,605

[1] Based on data from a mill survey and a logging utilization study (in process) for given years, and land use change estimates from the plot inventory.

[2] Average of field plot level removals between the study periods.

[3] International 1/4-inch rule.

Table 66. -- Current annual mortality for 1979 and 1992, and average annual mortality for 1980-1992 of growing stock and sawtimber on timberland by softwoods and hardwoods, and Forest Survey Unit, Michigan

Forest Survey Unit and softwoods and hardwoods	Growing stock			Sawtimber		
	Current annual mortality	Average annual mortality	Current annual mortality	Current annual mortality	Average annual mortality	Current annual mortality
	1979	1980-1992	1992	1979	1980-1992	1992
	(In thousand cubic feet)			*(In thousand board feet)* [1]		
Eastern Upper Peninsula						
Softwoods	17,407	19,369	19,974	34,976	40,855	48,126
Hardwoods	19,460	23,543	24,526	36,780	47,169	54,467
Total	36,867	42,912	44,500	71,756	88,024	102,593
Western Upper Peninsula						
Softwoods	20,554	24,316	22,153	49,085	63,549	58,075
Hardwoods	35,200	39,645	39,968	74,843	93,805	98,089
Total	55,754	63,961	62,121	123,928	157,354	156,164
Northern Lower Peninsula						
Softwoods	14,115	17,304	14,896	24,963	35,715	35,664
Hardwoods	39,145	52,570	57,872	70,402	107,999	126,506
Total	53,260	69,874	72,768	95,365	143,714	162,170
Southern Lower Peninsula						
Softwoods	643	1,256	1,060	1,865	3,017	3,643
Hardwoods	10,033	20,490	19,925	20,357	43,877	45,636
Total	10,676	21,746	20,985	22,222	46,894	49,279
All Units						
Softwoods	52,719	62,245	58,083	110,889	143,136	145,508
Hardwoods	103,838	136,248	142,291	202,382	292,850	324,698
Total	156,557	198,493	200,374	313,271	435,986	470,206

[1] International 1/4-inch rule.

Table 67. -- Average annual mortality of growing stock on timberland by species group and cause of death, Michigan, 1980-1992

(In thousand cubic feet)

Species group	All causes	Cause of death								
		Insects	Disease	Weather	Animals	Fire	Suppression	Vine damage	Human caused	Other and unknown
Softwoods										
Jack pine	11,201	289	138	30	96	121	49	-	44	10,434
Red pine	577	10	10	23	-	20	-	-	7	507
White pine	2,229	33	143	182	1	21	2	-	45	1,802
White spruce	5,302	30	207	330	23	-	8	-	75	4,629
Black spruce	7,841	77	234	303	1	-	16	-	73	7,137
Balsam fir	26,038	133	748	921	33	11	72	25	288	23,807
Hemlock	2,558	-	107	50	28	-	6	-	51	2,316
Tamarack	1,710	19	49	174	48	5	2	-	8	1,405
Eastern redcedar	1	-	-	-	-	-	-	-	-	1
Northern white-cedar	4,356	-	124	489	1	4	4	-	85	3,649
Other softwoods	432	-	-	-	-	-	29	-	-	403
Total softwoods	62,245	591	1,760	2,502	231	182	188	25	676	56,090
Hardwoods										
Select white oak	984	-	77	17	-	-	-	-	-	890
Select red oak	6,664	283	87	71	2	5	7	7	80	6,122
Other red oak	1,879	53	100	-	-	-	-	19	15	1,692
Select hickory	444	-	-	-	-	-	-	3	-	441
Other hickory	290	-	3	-	-	-	-	5	4	278
Basswood	4,053	57	124	202	1	-	-	9	13	3,647
Beech	856	8	50	64	1	-	-	-	5	728
Yellow birch	6,860	29	586	65	11	12	4	-	69	6,084
Hard maple	8,868	67	301	217	-	-	19	3	112	8,149
Soft maple	10,789	38	406	679	76	11	8	20	179	9,372
Elm	14,286	5	7,804	79	6	-	3	136	37	6,216
Black ash	3,188	1	21	198	90	-	-	2	22	2,854
White & green ash	2,832	18	55	158	3	-	-	14	29	2,555
Sycamore	26	-	-	-	-	-	-	-	1	25
Cottonwood	350	-	9	-	-	-	-	10	1	330
Willow	433	-	5	13	-	-	-	3	-	412
Hackberry	12	-	-	-	-	-	-	8	-	4
Balsam poplar	8,258	67	234	223	11	-	-	7	9	7,707
Bigtooth aspen	13,711	279	475	63	122	-	1	21	124	12,626
Quaking aspen	37,265	495	3,132	929	376	16	2	13	171	32,131
Paper birch	11,119	166	440	167	27	-	1	2	91	10,225
Tupelo	7	-	-	-	-	-	-	-	1	6
Black cherry	2,221	48	70	96	-	-	-	8	85	1,914
Black walnut	182	-	3	-	-	-	-	5	1	173
Butternut	71	-	-	-	-	-	-	-	-	71
Yellow-poplar	63	-	1	-	-	-	-	1	1	60
Sassafras	370	-	10	13	-	-	-	11	19	317
Other hardwoods	167	-	6	-	-	-	-	6	-	155
Total hardwoods	136,248	1,614	13,999	3,254	726	44	45	313	1,069	115,184
All species	198,493	2,205	15,759	5,756	957	226	233	338	1,745	171,274

Table 68. -- Average annual mortality of sawtimber on timberland by species group and cause of death, Michigan, 1980-1992

(In thousand board feet)[1]

Species group	All causes	Cause of death								
		Insects	Disease	Weather	Animals	Fire	Suppression	Vine damage	Human caused	Other and unknown
Softwoods										
Jack pine	23,515	500	384	30	403	273	103	-	103	21,719
Red pine	1,809	54	62	117	-	106	-	-	3	1,467
White pine	9,403	167	279	978	15	113	-	-	137	7,714
White spruce	20,782	128	616	1,450	123	-	1	-	87	18,377
Black spruce	12,537	104	667	365	5	-	-	-	4	11,392
Balsam fir	45,547	154	1,719	1,874	99	21	-	-	263	41,417
Hemlock	12,073	2	564	264	210	-	19	-	244	10,770
Tamarack	3,985	-	171	611	109	24	-	-	18	3,052
Eastern redcedar	8	-	-	-	-	-	-	-	-	8
Northern white-cedar	13,365	1	753	1,203	19	20	-	1	56	11,312
Other softwoods	112	-	-	-	2	-	43	-	-	67
Total softwoods	143,136	1,110	5,215	6,892	985	557	166	1	915	127,295
Hardwoods										
Select white oak	3,166	22	339	76	-	2	-	10	18	2,699
Select red oak	13,412	585	207	218	-	-	-	16	150	12,236
Other red oak	4,445	90	520	-	2	-	-	61	54	3,718
Select hickory	1,376	-	3	-	-	-	-	9	-	1,364
Other hickory	799	-	13	-	-	-	-	13	6	767
Basswood	11,289	185	480	672	10	-	-	26	30	9,886
Beech	2,883	25	196	293	16	-	-	-	27	2,326
Yellow birch	22,260	3	2,218	77	49	27	15	-	100	19,771
Hard maple	21,450	251	1,161	416	18	-	-	7	211	19,386
Soft maple	23,506	82	1,239	1,769	227	-	-	38	160	19,991
Elm	28,641	-	15,447	313	16	-	-	441	44	12,380
Black ash	4,549	-	59	370	111	-	-	2	4	4,003
White & green ash	5,729	80	184	228	-	-	-	44	26	5,167
Sycamore	44	-	-	-	-	-	-	-	-	44
Cottonwood	1,333	-	41	-	-	-	-	39	-	1,253
Willow	1,331	-	10	40	-	-	-	5	-	1,276
Hackberry	6	-	-	-	-	-	-	6	-	-
Balsam poplar	23,419	60	574	584	9	-	-	31	-	22,161
Bigtooth aspen	30,575	615	1,253	42	192	-	-	92	168	28,213
Quaking aspen	74,557	794	5,915	2,013	782	-	-	26	221	64,806
Paper birch	14,699	111	685	98	47	-	-	-	84	13,674
Tupelo	7	-	-	-	-	-	-	-	-	7
Black cherry	1,834	20	153	82	-	-	-	9	21	1,549
Black walnut	740	-	12	-	-	-	-	18	-	710
Butternut	174	-	7	-	-	-	-	-	-	167
Yellow-poplar	146	-	4	-	-	-	-	2	3	137
Sassafras	409	-	33	-	-	-	-	17	7	352
Other hardwoods	71	-	17	-	-	-	-	7	-	47
Total hardwoods	292,850	2,923	30,770	7,291	1,479	29	15	919	1,334	248,090
All species	435,986	4,033	35,985	14,183	2,464	586	181	920	2,249	375,385

[1]International 1/4-inch rule.

Table 69. -- Current annual timber removals of growing stock and sawtimber on timberland by species group, product, logging residue, and other removals, Michigan, 1992

Species group	All removals	Growing stock								Nonproduct removals	
		Removals for products (items)									
		All products removals	Saw logs	Veneer logs	Pulpwood	Composite products [1]	Fuelwood	Posts, poles, & pilings	Misc. products	Logging residue	Other removals
		(In thousand cubic feet)									
Softwoods											
Jack pine	25,520	23,611	2,567	5	13,039	5,848	2,126	26	-	1,369	540
Red pine	23,669	22,197	14,916	29	3,306	883	2,500	208	355	1,010	462
White pine	5,948	4,268	2,949	99	890	49	114	22	145	226	1,454
White spruce	4,070	3,320	182	10	3,096	24	1	1	6	443	307
Black spruce	2,833	2,279	89	10	2,155	17	-	2	6	303	251
Balsam fir	7,979	6,425	213	-	6,101	108	3	-	-	845	709
Hemlock	3,438	2,961	472	22	2,441	1	25	-	-	142	335
Tamarack	719	543	4	2	532	-	5	-	-	72	104
Northern white-cedar	9,949	6,117	1,951	-	445	14	11	3,201	495	982	2,850
Other softwoods	485	291	-	-	-	288	1	2	-	-	194
Total softwoods	84,610	72,012	23,343	177	32,005	7,232	4,786	3,462	1,007	5,392	7,206
Hardwoods											
Select white oak	6,212	5,333	3,100	165	1,620	-	448	-	-	470	409
Select red oak	23,560	20,294	13,950	576	2,616	512	2,610	30	-	1,994	1,272
Other red oak	5,227	4,285	3,304	70	413	62	436	-	-	436	506
Select hickory	119	103	99	-	-	-	4	-	-	16	-
Other hickory	292	86	82	1	-	-	3	-	-	14	192
Basswood	8,012	6,597	4,512	164	1,766	126	29	-	-	1,202	213
Beech	5,342	4,168	1,830	417	1,713	90	118	-	-	633	541
Yellow birch	3,584	2,769	1,344	173	1,189	-	63	-	-	411	404
Hard maple	42,370	35,744	16,061	2,122	15,185	995	1,379	-	2	5,181	1,445
Soft maple	35,938	28,343	9,297	263	13,951	2,947	1,883	-	2	4,104	3,491
Elm	1,043	700	128	7	204	-	361	-	-	59	284
Black ash	2,268	1,479	826	54	375	20	204	-	-	195	594
White & green ash	4,229	3,559	2,171	140	911	25	312	-	-	482	188
Sycamore	179	147	147	-	-	-	-	-	-	32	-
Cottonwood	1,080	612	573	7	4	-	28	-	-	125	343
Willow	123	1	-	-	-	-	1	-	-	-	122
Hackberry	420	346	346	-	-	-	-	-	-	74	-
Balsam poplar	6,139	5,156	171	2	2,279	2,704	-	-	-	743	240
Bigtooth aspen	46,591	42,808	11,817	129	14,913	14,588	1,313	-	48	3,050	733
Quaking aspen	62,331	56,199	8,640	776	23,391	22,426	688	-	278	3,963	2,169
Paper birch	15,690	12,323	1,586	220	9,541	859	117	-	-	1,768	1,599
Black cherry	3,747	3,054	1,058	84	1,756	-	156	-	-	491	202
Black walnut	499	427	373	47	-	-	7	-	-	72	-
Butternut	43	35	35	-	-	-	-	-	-	8	-
Yellow-poplar	395	325	321	4	-	-	-	-	-	70	-
Sassafras	175	3	2	-	-	-	1	-	-	-	172
Other hardwoods	259	239	78	2	10	-	137	12	-	20	-
Total hardwoods	275,867	235,135	81,851	5,423	91,837	45,354	10,298	42	330	25,613	15,119
All species	360,477	307,147	105,194	5,600	123,842	52,586	15,084	3,504	1,337	31,005	22,325

(Table 69 continued)

Species group	All removals	Sawtimber									
		Removals for products								Nonproduct removals	
		All products removals	Saw logs	Veneer logs	Pulpwood	Composite products [1]	Fuelwood	Posts, poles, & pilings	Misc. products	Logging residue	Other removals
		(In thousand board feet) [2]									
Softwoods											
Jack pine	66,122	65,007	13,303	34	29,054	17,687	4,903	26	-	795	320
Red pine	111,035	107,084	87,748	190	8,464	2,313	5,764	523	2,082	2,368	1,583
White pine	28,795	21,571	17,347	637	2,279	176	263	23	846	493	6,731
White spruce	11,066	9,453	945	68	8,319	84	1	4	32	787	826
Black spruce	7,329	6,413	460	64	5,792	60	1	5	31	538	378
Balsam fir	20,196	17,892	1,105	-	16,395	384	8	-	-	1,495	809
Hemlock	10,963	9,227	2,777	138	6,249	5	58	-	-	211	1,525
Tamarack	1,799	1,473	21	11	1,430	-	11	-	-	126	200
Northern white-cedar	25,633	17,182	10,113	-	1,197	48	26	3,296	2,502	2,325	6,126
Other softwoods	1,291	1,030	-	-	-	1,025	3	2	-	1	260
Total softwoods	284,229	256,332	133,819	1,142	79,179	21,782	11,038	3,879	5,493	9,139	18,758
Hardwoods											
Select white oak	22,256	19,964	16,712	1,069	1,180	-	1,003	0	-	1,284	1,008
Select red oak	97,071	87,171	75,211	3,718	1,655	450	5,949	188	-	5,636	4,264
Other red oak	22,492	19,617	17,810	454	311	54	988	0	-	1,295	1,580
Select hickory	627	588	576	3	-	-	9	-	-	39	-
Other hickory	1,630	492	483	2	-	-	7	-	-	33	1,105
Basswood	31,937	28,512	24,840	1,060	2,445	110	57	-	-	2,652	773
Beech	21,039	18,406	10,713	2,691	4,654	79	269	-	-	1,241	1,392
Yellow birch	14,282	12,175	7,865	1,115	3,050	-	145	-	-	834	1,273
Hard maple	169,112	155,487	97,534	13,706	39,467	1,682	3,086	-	12	10,729	2,896
Soft maple	94,327	81,310	51,180	1,697	20,744	3,408	4,269	-	12	7,290	5,727
Elm	2,113	1,857	703	46	314	-	794	-	-	103	153
Black ash	7,523	6,601	4,843	351	927	18	462	-	-	422	500
White & green ash	17,892	16,382	12,705	901	2,047	22	707	-	-	1,067	443
Sycamore	888	810	808	2	-	-	-	-	-	78	-
Cottonwood	4,992	3,270	3,155	47	5	-	63	-	-	305	1,417
Willow	126	2	-	-	-	-	2	-	-	-	124
Hackberry	2,088	1,906	1,906	-	-	-	-	-	-	182	-
Balsam poplar	10,090	8,538	939	16	3,422	4,161	-	-	-	885	667
Bigtooth aspen	116,246	111,692	57,580	834	25,220	24,781	3,024	-	253	3,285	1,269
Quaking aspen	133,445	127,483	42,097	5,005	39,633	37,714	1,585	-	1,449	4,042	1,920
Paper birch	29,725	25,807	8,732	1,416	14,548	845	266	-	-	2,455	1,463
Black cherry	10,452	9,374	5,827	544	2,651	-	352	-	-	859	219
Black walnut	2,667	2,502	2,179	306	-	-	17	-	-	165	-
Butternut	211	193	193	-	-	-	-	-	-	18	-
Yellow-poplar	1,963	1,793	1,767	26	-	-	-	-	-	170	-
Sassafras	304	12	12	-	-	-	-	-	-	1	291
Other hardwoods	878	836	429	12	10	-	310	75	-	42	-
Total hardwoods	816,376	742,780	446,799	35,021	162,283	73,324	23,364	263	1,726	45,112	28,484
All species	1,100,605	999,112	580,618	36,163	241,462	95,106	34,402	4,142	7,219	54,251	47,242

[1] Includes chip board, oriented strand board, particleboard, engineered lumber, etc.

[2] International 1/4-inch rule

Table 70. -- Total volume of wood fiber used for each primary product by softwoods and hardwoods, and source of material, Michigan, 1992

Product by softwoods and hardwoods	Standard units	Total		Roundwood products				Plant byproducts [1]	
				Growing stock		Nongrowing stock			
		Number of units	Thousand cubic feet[2]	Number of units	Thousand cubic feet	Number of units	Thousand cubic feet	Number of units	Thousand cubic feet
Saw logs									
Softwoods	*Thousand*	140,266	24,100	135,928	23,343	4,338	757	-	-
Hardwoods	*board feet* [3]	492,112	84,766	475,183	81,851	16,929	2,915	-	-
Total		632,378	108,866	611,111	105,194	21,267	3,672	-	-
Veneer logs									
Softwoods	*Thousand*	1,206	197	1,086	177	120	20	-	-
Hardwoods	*board feet* [3]	36,989	6,022	33,308	5,423	3,681	599	-	-
Total		38,195	6,219	34,394	5,600	3,801	619	-	-
Pulpwood[4]									
Softwoods	*Standard*	454,250	35,885	405,127	32,005	44,132	3,486	4,991	394
Hardwoods	*cords*	1,602,648	126,609	1,162,498	91,837	282,107	22,286	158,043	12,486
Total		2,056,898	162,494	1,567,625	123,842	326,239	25,772	163,034	12,880
Composite products[5]									
Softwoods	*Standard*	168,276	13,294	91,541	7,232	25,525	2,016	51,210	4,046
Hardwoods	*cords*	678,761	53,623	574,101	45,354	64,007	5,057	40,653	3,212
Total		847,037	66,917	665,642	52,586	89,532	7,073	91,863	7,258
Fuelwood									
Softwoods	*Standard*	300,612	21,030	68,471	4,786	75,912	5,308	156,229	10,936
Hardwoods	*cords*	1,394,119	97,575	147,220	10,298	585,947	41,010	660,952	46,267
Total		1,694,731	118,605	215,691	15,084	661,859	46,318	817,181	57,203
Posts, poles and pilings									
Softwoods	*Thousand*	3,881	3,881	3,462	3,462	419	419	-	-
Hardwoods	*cubic feet*	54	54	42	42	12	12	-	-
Total		3,935	3,935	3,504	3,504	431	431	-	-
Miscellaneous									
Softwoods	*Thousand*	5,244	5,244	1,007	1,007	43	43	4,194	4,194
Hardwoods	*cubic feet*	16,011	16,011	330	330	-	-	15,681	15,681
Total		21,255	21,255	1,337	1,337	43	43	19,875	19,875
All products									
Softwoods	*Thousand*				72,012		12,049		19,570
Hardwoods	*cubic feet*				235,135		71,879		77,646
Total					307,147		83,928		97,216

[1] Includes coarse and fine wood residues.

[2] Column should not be added to avoid double counting volume.

[3] International 1/4-inch rule.

[4] Includes roundwood and plant byproducts for wood pulp.

[5] Includes roundwood and plant byproducts for composite products.

Table 71. -- Output of roundwood products by product, softwoods and hardwoods, and source of material, Michigan, 1992

(In thousand cubic feet)

Product by softwoods and hardwoods	All sources	Growing stock			Rough and rotten trees	Salvable dead trees	Other sources
		Total	Sawtimber	Poletimber			
Saw logs							
Softwoods	24,100	23,343	22,956	387	17	283	457
Hardwoods	84,766	81,851	76,799	5,052	893	370	1,652
Total	108,866	105,194	99,755	5,439	910	653	2,109
Veneer logs							
Softwoods	196	177	177	-	19	-	-
Hardwoods	6,023	5,423	5,423	-	589	-	11
Total	6,219	5,600	5,600	-	608	-	11
Pulpwood							
Softwoods	35,491	32,005	20,655	11,350	573	864	2,049
Hardwoods	114,124	91,837	41,276	50,561	12,508	1,060	8,719
Total	149,615	123,842	61,931	61,911	13,081	1,924	10,768
Composite products [1]							
Softwoods	9,248	7,232	5,640	1,592	75	320	1,621
Hardwoods	50,411	45,354	18,312	27,042	1,960	462	2,635
Total	59,659	52,586	23,952	28,634	2,035	782	4,256
Fuelwood							
Softwoods	10,095	4,786	2,168	2,618	475	277	4,557
Hardwoods	51,307	10,298	4,812	5,486	962	15,327	24,720
Total	61,402	15,084	6,980	8,104	1,437	15,604	29,277
Posts, poles and pilings							
Softwoods	3,881	3,462	1,037	2,425	46	63	310
Hardwoods	54	42	42	-	-	12	-
Total	3,935	3,504	1,079	2,425	46	75	310
Miscellaneous products							
Softwoods	1,051	1,008	976	32	2	19	22
Hardwoods	330	330	241	89	-	-	-
Total	1,381	1,338	1,217	121	2	19	22
All products							
Softwoods	84,062	72,012	53,607	18,405	1,206	1,826	9,018
Hardwoods	307,015	235,135	146,905	88,230	16,912	17,231	37,737
Total	391,077	307,147	200,512	106,635	18,118	19,057	46,755

[1] Includes chip board, oriented strand board, particleboard, engineered lumber, etc.

Table 72. -- Timber products from roundwood by species group and product, Michigan, 1992

Species group	All products	Saw logs		Veneer logs		Pulpwood		Composite products[1]		Fuelwood		Posts, poles, and pilings	Misc. products
	Thousand cubic feet	*Thousand board feet [2]*	*Thousand cubic feet*	*Thousand board feet [2]*	*Thousand cubic feet*	*Cords*	*Thousand cubic feet*	*Cords*	*Thousand cubic feet*	*Cords*	*Thousand cubic feet*	*Thousand cubic feet*	*Thousand cubic feet*
Softwoods													
Jack pine	28,886	14,381	2,708	36	6	186,000	14,693	94,863	7,494	56,566	3,955	30	-
Red pine	26,168	91,283	15,308	200	33	49,790	3,933	13,432	1,061	75,085	5,250	218	365
White pine	5,070	18,045	3,027	674	109	13,405	1,059	869	69	9,001	630	25	151
White spruce	3,484	1,021	192	71	11	41,007	3,240	413	33	6	-	1	7
Black spruce	2,392	499	94	67	11	28,548	2,256	293	23	7	-	2	6
Balsam fir	6,767	1,195	225	-	-	80,803	6,384	1,890	149	133	9	-	-
Hemlock	3,460	2,888	484	146	24	36,761	2,904	22	2	664	46	-	-
Tamarack	572	22	4	12	2	7,046	557	-	-	128	9	-	-
Northern white-cedar	6,751	10,932	2,058	-	-	5,899	465	238	18	1,208	85	3,603	522
Other softwoods	512	-	-	-	-	-	-	5,046	399	1,587	111	2	-
Total softwoods	84,062	140,266	24,100	1,206	196	449,259	35,491	117,066	9,248	144,385	10,095	3,881	1,051
Hardwoods													
Select white oak	10,108	18,831	3,305	1,129	184	25,733	2,033	-	-	65,522	4,586	-	-
Select red oak	31,394	84,755	14,874	3,927	639	41,659	3,291	8,103	640	170,343	11,920	30	-
Other red oak	7,475	20,070	3,522	479	78	6,556	518	982	78	46,846	3,279	-	-
Select hickory	276	607	102	3	1	-	-	-	-	2,478	173	-	-
Other hickory	231	508	86	3	-	-	-	-	-	2,073	145	-	-
Basswood	7,184	26,172	4,595	1,120	182	27,100	2,141	1,986	157	1,551	109	-	-
Beech	6,374	11,291	1,901	2,842	463	35,455	2,801	1,424	112	15,667	1,097	-	-
Yellow birch	3,689	8,289	1,395	1,177	192	24,134	1,907	-	-	2,781	195	-	-
Hard maple	49,917	102,494	16,625	14,475	2,358	309,519	24,451	17,881	1,413	72,431	5,068	-	2
Soft maple	38,339	53,925	9,469	1,792	292	212,729	16,805	45,871	3,624	116,422	8,147	-	2
Elm	3,892	740	130	49	8	3,095	245	-	-	50,135	3,509	-	-
Black ash	2,141	5,106	860	370	60	7,511	593	317	25	8,614	603	-	-
White & green ash	5,243	13,392	2,256	952	155	17,722	1,400	394	31	20,022	1,401	-	-
Sycamore	150	852	150	2	-	-	-	-	-	-	-	-	-
Cottonwood	807	3,324	584	50	8	63	5	-	-	3,008	210	-	-
Willow	38	-	-	-	-	-	-	-	-	539	38	-	-
Hackberry	353	2,008	353	-	-	-	-	-	-	-	-	-	-
Balsam poplar	6,167	990	174	17	3	34,725	2,743	41,098	3,247	-	-	-	-
Bigtooth aspen	47,621	68,507	12,050	881	143	204,631	16,167	201,608	15,927	46,983	3,286	-	48
Quaking aspen	61,453	50,085	8,810	5,287	861	321,933	25,432	304,933	24,090	28,332	1,982	-	278
Paper birch	14,945	9,199	1,615	1,496	244	145,153	11,468	13,511	1,067	7,878	551	-	-
Black cherry	4,766	6,141	1,079	574	93	26,733	2,112	-	-	21,173	1,482	-	-
Black walnut	767	2,297	387	324	53	-	-	-	-	4,679	327	-	-
Butternut	36	203	36	-	-	-	-	-	-	-	-	-	-
Yellow-poplar	331	1,862	327	27	4	-	-	-	-	-	-	-	-
Sassafras	21	12	2	-	-	-	-	-	-	272	19	-	-
Other hardwoods	2,405	452	79	13	2	155	12	-	-	32,679	2,288	24	-
Noncommercial species	892	-	-	-	-	-	-	-	-	12,739	892	-	-
Total hardwoods	307,015	492,112	84,766	36,989	6,023	1,444,606	114,124	638,108	50,411	733,167	51,307	54	330
All species	391,077	632,378	108,866	38,195	6,219	1,893,865	149,615	755,174	59,659	877,552	61,402	3,935	1,381

[1] Includes chip board, oriented strand board, particleboard, engineered lumber, etc.

[2] International 1/4-inch rule.

Table 73. -- Volume of primary plant residue by use and type of wood residue, and softwoods and hardwoods, Michigan, 1992

(In thousand cubic feet)

Use	Wood residue							
	Total		Coarse[1]		Fine[2]		Bark	
	Softwoods	Hardwoods	Softwoods	Hardwoods	Softwoods	Hardwoods	Softwoods	Hardwoods
Fiber products[3]	4,440	15,234	4,092	15,053	348	181	-	463
Fuel	4,514	12,412	1,568	6,676	2,946	5,736	6,422	33,854
Miscellaneous[4]	1,468	7,368	686	1,039	782	6,329	2,726	8,313
Not used[5]	302	1,000	234	448	68	552	90	336
Total	10,724	36,014	6,580	23,216	4,144	12,798	9,238	42,966

[1] Suitable for chipping such as slabs, edgings, veneer cores, etc.

[2] Not suitable for chipping such as sawdust, veneer clippings, etc.

[3] For manufacture of pulp, hardboard, roofing felt, particleboard, etc.

[4] Livestock bedding, mulch, small dimension and specialty items.

[5] Includes residue burned as waste.

Table 74. -- All live tree biomass yields on timberland by species group and forest type, Michigan, 1993

(In pounds per acre green weight)

Species group	Mean for all types	Forest type														
		Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar	Tamarack	Oak-hickory	Elm-ash-soft maple	Maple-beech-birch	Aspen	Paper birch	Balsam poplar	Non-stocked
Softwoods																
Jack pine	2,830	45,979	5,251	2,423	352	1,062	2,606	16	154	2,141	46	130	532	538	-	1,545
Red pine	6,257	7,183	102,891	10,105	1,208	1,407	1,257	246	85	1,952	255	622	1,720	1,774	151	749
White pine	3,514	2,173	6,647	73,526	4,507	4,380	3,787	3,022	1,429	2,747	1,097	2,489	1,901	3,379	340	11
White spruce	2,129	411	948	4,272	10,949	46,991	1,578	2,838	362	169	1,026	1,365	2,432	3,164	2,868	91
Black spruce	2,254	1,212	357	3,127	6,083	2,578	46,229	6,171	8,231	19	635	246	634	1,173	783	-
Balsam fir	5,771	370	1,278	5,687	41,182	10,291	7,286	14,063	4,769	133	4,574	3,533	6,425	14,552	12,794	46
Hemlock	3,639	-	206	1,354	1,296	125	440	1,901	-	132	1,473	8,185	482	1,823	519	-
Tamarack	1,020	42	81	190	1,686	601	6,828	3,921	45,266	11	545	75	234	877	1,432	-
Eastern redcedar	16	-	-	61	-	-	-	-	-	78	3	19	-	-	-	-
Northern white-cedar	9,396	36	238	1,333	10,165	5,823	4,871	93,809	11,065	62	6,068	2,248	2,320	10,827	9,563	-
Other softwoods	668	10,585	1,047	246	118	762	24	28	-	205	81	225	37	39	-	-
Total softwoods	37,494	67,991	118,944	102,324	77,546	74,020	74,906	126,015	71,361	7,649	15,803	19,137	16,717	38,146	28,450	2,442
Hardwoods																
Select white oak	5,176	654	2,128	4,411	-	-	-	8	25	35,841	3,003	2,007	882	655	-	-
Other white oak	6	-	-	-	-	-	-	-	-	22	46	-	1	-	-	-
Select red oak	10,223	4,241	4,901	6,732	356	930	2	37	167	61,836	1,641	5,400	5,783	3,196	303	-
Other red oak	2,691	2,120	2,873	2,563	-	-	-	-	-	19,109	605	660	551	-	342	-
Select hickory	573	36	-	-	-	-	-	-	-	3,002	218	602	8	-	-	-
Other hickory	384	167	28	-	-	-	-	-	-	1,750	99	468	-	-	-	-
Basswood	3,914	213	132	67	241	53	-	164	-	989	1,880	9,019	881	722	91	-
Beech	3,353	4	254	391	82	-	-	10	-	687	315	8,247	380	303	-	-
Yellow birch	4,293	19	16	516	2,579	708	184	2,803	132	71	3,319	9,353	494	1,318	485	-
Hard maple	28,253	727	1,592	3,324	3,228	2,583	118	1,059	13	1,850	2,450	69,525	4,274	7,951	813	-
Soft maple	22,169	1,604	4,850	9,794	9,578	8,003	2,391	6,971	1,807	14,910	52,719	32,056	13,552	19,862	2,137	406
Elm	2,208	68	65	109	135	342	103	212	389	1,061	7,746	3,340	548	466	1,178	-
Black ash	2,587	-	-	328	1,980	669	63	4,843	730	178	15,701	1,458	937	1,912	4,204	-
White & green ash	4,594	116	374	177	90	101	67	586	239	2,428	13,836	7,380	1,250	1,703	618	-
Sycamore	114	-	-	-	-	-	-	-	-	48	886	81	-	-	-	-
Cottonwood	638	18	-	-	-	-	-	29	-	313	4,385	508	136	188	72	-
Willow	320	-	97	-	6	69	13	19	-	90	2,471	210	33	73	65	-
Hackberry	28	-	-	-	-	-	-	-	-	44	113	34	-	-	-	-
Balsam poplar	1,968	366	138	965	3,119	2,500	520	3,889	839	59	2,040	495	3,063	5,847	59,812	-
Bigtooth aspen	6,416	649	2,568	3,635	887	292	322	287	92	8,214	1,123	3,557	25,996	4,812	554	-
Quaking aspen	11,875	2,378	3,529	8,092	13,855	15,894	5,154	4,515	1,272	2,131	6,137	6,896	46,655	15,496	11,656	529
Paper birch	5,295	333	1,181	6,195	10,531	10,455	3,726	8,965	2,459	1,176	3,646	3,420	6,970	73,717	6,477	-
Tupelo	55	-	-	-	-	-	-	-	-	136	233	32	35	144	-	-
Black cherry	3,293	1,429	1,884	678	1,341	1,934	355	201	345	3,943	1,653	5,855	1,531	439	295	14
Black walnut	308	21	16	-	-	-	-	4	-	1,558	72	346	-	-	-	-
Butternut	56	55	-	-	-	-	-	27	-	124	117	73	-	-	-	-
Yellow-poplar	188	40	8	-	-	-	-	-	-	173	365	353	-	-	-	-
Sassafras	422	335	120	4	-	-	-	-	-	1,410	94	618	35	-	-	-
Other hardwoods	315	40	65	-	18	45	-	12	2	401	1,115	413	40	-	374	-
Total hardwoods	121,715	15,633	26,819	47,981	48,026	44,578	13,018	34,641	8,511	163,554	128,028	172,406	114,035	138,804	89,476	949
Noncommercial species	1,401	135	128	549	316	294	131	165	60	973	1,476	2,642	644	490	462	34
All species	160,610	83,759	145,891	150,854	125,888	118,892	88,055	160,821	79,932	172,176	145,307	194,185	131,396	177,440	118,388	3,425

Table 75. -- All live tree biomass on timberland by species group and forest type, Michigan, 1993

(In green tons)

Species group	All types	Forest type														
		Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar	Tamarack	Oak-hickory	Elm-ash-soft maple	Maple-beech-birch	Aspen	Paper birch	Balsam poplar	Non-stocked
Softwoods																
Jack pine	26,340,397	19,451,450	2,355,792	283,205	99,013	78,037	606,123	10,830	11,480	2,121,619	37,461	465,587	711,663	78,393	-	29,744
Red pine	58,241,937	3,038,849	46,156,881	1,181,331	340,246	103,354	292,243	166,038	6,316	1,934,567	207,776	2,226,229	2,300,825	258,570	14,286	14,426
White pine	32,706,732	919,487	2,981,815	8,595,175	1,269,059	321,747	880,595	2,038,927	106,363	2,722,181	892,213	8,911,132	2,543,081	492,500	32,250	207
White spruce	19,818,359	173,735	425,095	499,371	3,082,710	3,451,491	367,028	1,914,822	26,967	167,373	834,261	4,887,107	3,253,513	461,126	272,001	1,759
Black spruce	20,975,927	512,890	159,954	365,595	1,712,754	189,362	10,750,500	4,163,350	612,781	18,717	516,596	880,290	847,930	170,959	74,249	-
Balsam fir	53,715,863	156,551	573,284	664,824	11,594,833	755,879	1,694,440	9,488,618	355,050	131,772	3,720,875	12,649,174	8,595,224	2,120,969	1,213,480	890
Hemlock	33,869,318	-	92,358	158,227	364,848	9,204	102,319	1,282,776	-	130,957	1,459,565	29,308,779	645,392	265,638	49,255	-
Tamarack	9,497,484	17,686	36,553	22,212	474,736	44,117	1,587,931	2,645,716	3,370,051	11,113	443,507	267,766	312,400	127,885	135,811	-
Eastern redcedar	153,143	-	-	7,091	-	-	-	-	-	76,953	2,301	66,798	-	-	-	-
Northern white-cedar	87,454,045	15,311	106,665	155,840	2,862,006	427,725	1,132,729	63,292,727	823,790	61,645	4,935,839	8,050,827	3,103,875	1,578,012	907,054	-
Other softwoods	6,219,468	4,477,999	469,738	28,740	33,143	56,001	5,635	18,770	-	203,591	65,563	805,310	49,266	5,712	-	-
Total softwoods	348,992,673	28,763,958	53,358,135	11,961,611	21,833,348	5,436,917	17,419,543	85,022,574	5,312,798	7,580,488	13,115,957	68,518,999	22,363,169	5,559,764	2,698,386	47,026
Hardwoods																
Select white oak	48,173,960	276,578	954,589	515,704	-	-	-	5,114	1,842	35,515,078	2,442,397	7,187,646	1,179,543	95,469	-	-
Other white oak	60,365	-	-	-	-	-	-	-	-	22,128	37,159	-	1,078	-	-	-
Select red oak	95,159,722	1,794,221	2,198,439	786,953	100,121	68,325	363	24,685	12,407	61,272,856	1,335,145	19,335,396	7,736,297	465,816	28,698	-
Other red oak	25,043,609	896,722	1,288,632	299,611	-	-	-	-	-	18,935,373	492,270	2,361,468	737,091	-	32,442	-
Select hickory	5,333,366	15,071	-	-	-	-	-	-	-	2,975,010	177,380	2,155,763	10,142	-	-	-
Other hickory	3,572,500	70,568	12,450	-	-	-	-	-	-	1,734,440	80,441	1,674,601	-	-	-	-
Basswood	36,434,255	90,145	59,035	7,875	67,718	3,928	-	110,455	-	979,676	1,529,424	32,293,387	1,178,812	105,193	8,607	-
Beech	31,211,534	1,831	114,150	45,719	23,089	-	-	6,468	-	681,053	255,994	29,530,136	508,984	44,110	-	-
Yellow birch	39,957,689	7,958	7,340	60,338	726,180	51,994	42,681	1,890,973	9,837	70,669	2,700,082	33,490,230	661,351	192,056	46,000	-
Hard maple	262,976,543	307,386	714,375	388,582	908,815	189,730	27,450	714,566	950	1,832,760	1,992,574	248,945,030	5,718,318	1,158,871	77,136	-
Soft maple	206,351,790	678,410	2,175,906	1,144,862	2,696,605	587,805	556,081	4,703,089	134,512	14,774,175	42,884,096	114,780,188	18,130,669	2,894,859	202,726	7,807
Elm	20,555,213	28,797	29,274	12,736	37,936	25,086	23,874	142,867	28,950	1,051,240	6,300,720	11,960,648	733,497	67,889	111,699	-
Black ash	24,082,758	-	-	38,393	557,482	49,126	14,733	3,267,574	54,385	176,220	12,772,137	5,222,062	1,253,286	278,624	398,736	-
White & green ash	42,763,445	48,873	167,710	20,684	25,479	7,382	15,657	395,443	17,809	2,406,205	11,254,580	26,424,860	1,671,931	248,225	58,607	-
Sycamore	1,056,903	-	-	-	-	-	-	-	-	47,484	720,327	289,092	-	-	-	-
Cottonwood	5,938,706	7,643	-	-	-	-	-	19,456	-	310,310	3,566,693	1,817,829	182,525	27,413	6,837	-
Willow	2,977,571	-	43,694	-	1,753	5,056	3,033	12,490	-	88,703	2,009,980	752,372	43,621	10,677	6,192	-
Hackberry	258,060	-	-	-	-	-	-	-	-	43,113	91,741	123,206	-	-	-	-
Balsam poplar	18,314,143	154,970	61,778	112,817	878,222	183,612	121,020	2,624,200	62,431	58,411	1,659,206	1,774,112	4,097,982	852,212	5,673,170	-
Bigtooth aspen	59,718,273	274,391	1,152,217	424,932	249,647	21,478	74,791	193,395	6,813	8,139,556	913,805	12,735,166	34,778,263	701,279	52,540	-
Quaking aspen	110,530,046	1,005,950	1,583,319	945,999	3,900,805	1,167,436	1,198,580	3,046,430	94,667	2,111,450	4,992,347	24,691,813	62,416,943	2,258,553	1,105,573	10,181
Paper birch	49,286,234	140,974	529,891	724,235	2,965,112	767,922	866,565	6,048,686	183,090	1,165,089	2,965,872	12,245,630	9,324,530	10,744,267	614,371	-
Tupelo	507,588	-	-	-	-	-	-	-	-	134,818	189,195	115,275	47,358	20,942	-	-
Black cherry	30,649,968	604,711	845,311	79,242	377,631	142,058	82,511	135,684	25,661	3,907,045	1,344,853	20,965,371	2,047,600	64,035	27,980	275
Black walnut	2,862,688	8,886	7,252	-	-	-	-	2,854	-	1,544,061	58,949	1,240,686	-	-	-	-
Butternut	520,170	23,462	-	-	-	-	-	18,000	-	122,413	94,841	261,454	-	-	-	-
Yellow-poplar	1,751,821	16,836	3,736	-	-	-	-	-	-	171,051	296,634	1,263,564	-	-	-	-
Sassafras	3,931,639	141,629	54,047	464	-	-	-	-	-	1,397,148	76,790	2,214,566	46,995	-	-	-
Other hardwoods	2,934,432	16,892	29,116	-	5,118	3,330	-	8,055	137	397,695	906,975	1,477,657	53,967	-	35,490	-
Total hardwoods	1,132,914,991	6,612,904	12,032,261	5,609,146	13,521,713	3,274,268	3,027,339	23,370,484	633,491	162,065,230	104,142,607	617,329,208	152,560,783	20,230,490	8,486,804	18,263
Noncommercial species	13,036,811	57,257	57,495	64,220	89,023	21,598	30,436	111,133	4,452	964,051	1,200,942	9,458,660	861,623	71,399	43,861	661
All species	1,494,944,475	35,434,119	65,447,891	17,634,977	35,444,084	8,732,783	20,477,318	108,504,191	5,950,741	170,609,769	118,459,506	695,306,867	175,785,575	25,861,653	11,229,051	65,950

Table 76. -- All live tree biomass on timberland by species group and tree biomass component (in green tons), Michigan, 1993

(In green tons)

Species group	All components	Tree biomass component						
		All live 1-5-inch trees	Growing-stock trees			Nongrowing-stock trees		
			Stumps	Boles	Tops and limbs	Stumps	Boles	Tops and limbs
Softwoods								
Jack pine	26,340,397	4,751,797	1,300,882	16,662,059	2,049,836	100,445	1,316,486	158,892
Red pine	58,241,937	4,724,300	3,095,470	44,204,805	5,296,291	55,234	772,116	93,721
White pine	32,706,732	2,968,459	1,484,542	23,554,852	2,527,119	123,894	1,847,955	199,911
White spruce	19,818,359	2,557,044	1,120,901	12,456,015	3,341,257	23,603	251,460	68,079
Black spruce	20,975,927	7,212,983	868,649	9,522,377	3,109,738	16,485	185,662	60,033
Balsam fir	53,715,863	20,745,445	2,410,530	22,663,630	7,161,340	52,114	526,912	155,892
Hemlock	33,869,318	1,631,389	1,779,681	21,379,050	5,001,220	264,797	3,070,368	742,813
Tamarack	9,497,484	2,202,383	450,796	5,524,017	690,781	41,650	524,654	63,203
Eastern redcedar	153,143	39,677	6,755	72,506	23,371	642	7,945	2,247
Northern white-cedar	87,454,045	19,874,638	5,213,322	38,635,523	11,532,152	1,082,455	8,719,264	2,396,691
Other softwoods	6,219,468	1,362,307	283,165	2,877,710	893,472	54,951	574,204	173,659
Total softwoods	348,992,673	68,070,422	18,014,693	197,552,544	41,626,577	1,816,270	17,797,026	4,115,141
Hardwoods								
Select white oak	48,173,960	2,477,245	2,529,518	29,721,599	8,769,679	269,877	3,496,879	909,163
Other white oak	60,365	3,918	2,405	23,400	8,514	1,627	15,391	5,110
Select red oak	95,159,722	2,673,185	4,581,421	62,150,222	18,162,143	406,613	5,628,218	1,557,920
Other red oak	25,043,609	910,699	1,281,249	15,688,425	4,657,507	152,101	1,828,692	524,936
Select hickory	5,333,366	240,362	250,077	3,484,258	1,059,981	14,316	221,539	62,833
Other hickory	3,572,500	249,108	168,100	2,277,924	711,780	7,691	124,470	33,427
Basswood	36,434,255	1,653,391	1,792,257	23,139,371	7,294,811	141,539	1,854,730	558,156
Beech	31,211,534	1,904,635	1,245,228	16,415,052	4,879,880	364,902	5,008,638	1,393,199
Yellow birch	39,957,689	2,812,622	1,574,130	18,752,836	5,853,987	646,893	7,988,496	2,328,725
Hard maple	262,976,543	24,190,660	10,984,666	151,699,469	49,673,005	1,318,549	19,248,182	5,862,012
Soft maple	206,351,790	23,533,105	8,092,603	113,534,578	37,157,176	1,191,709	17,553,977	5,288,642
Elm	20,555,213	5,111,026	954,272	9,446,986	3,267,300	117,826	1,254,165	403,638
Black ash	24,082,758	7,162,623	1,073,401	10,174,679	3,651,212	148,451	1,373,797	498,595
White & green ash	42,763,445	5,007,724	1,873,448	25,360,428	7,997,439	132,043	1,836,866	555,497
Sycamore	1,056,903	2,198	39,610	760,387	191,102	2,660	48,978	11,968
Cottonwood	5,938,706	131,413	352,998	4,106,682	1,091,958	16,163	190,743	48,749
Willow	2,977,571	111,752	114,463	1,270,480	347,956	72,953	839,576	220,391
Hackberry	258,060	44,481	13,922	148,018	51,639	-	-	-
Balsam poplar	18,314,143	1,603,495	622,616	11,245,884	3,509,048	53,369	981,981	297,750
Bigtooth aspen	59,718,273	5,725,098	1,981,384	38,265,690	9,294,256	176,657	3,478,540	796,648
Quaking aspen	110,530,046	15,622,874	3,861,748	61,503,520	15,243,731	655,618	11,085,424	2,557,131
Paper birch	49,286,234	4,230,707	2,065,652	27,990,354	9,756,726	269,792	3,728,642	1,244,361
Tupelo	507,588	61,120	21,511	218,477	76,481	7,773	92,252	29,974
Black cherry	30,649,968	3,681,612	999,440	14,399,385	4,746,221	352,674	4,866,220	1,604,416
Black walnut	2,862,688	96,033	119,799	1,800,775	565,593	13,857	208,881	57,750
Butternut	520,170	59,819	15,804	240,775	74,741	5,967	95,102	27,962
Yellow-poplar	1,751,821	48,139	73,955	1,246,606	343,152	1,481	31,457	7,031
Sassafras	3,931,639	1,112,871	135,945	1,412,820	503,326	50,814	527,833	188,030
Other hardwoods	2,934,432	723,545	86,080	885,008	317,267	57,472	649,280	215,780
Total hardwoods	1,132,914,991	111,185,460	46,907,702	647,364,088	199,257,611	6,651,387	94,258,949	27,289,794
Noncommercial species	13,036,811	7,293,422	-	-	-	405,401	3,852,325	1,485,663
All species	1,494,944,475	186,549,304	64,922,395	844,916,632	240,884,188	8,873,058	115,908,300	32,890,598

Table 77. -- All live tree biomass on timberland by species group and tree biomass component (in thousand cubic feet), Michigan, 1993

(In thousand cubic feet)

Species group	All components	All live 1-5-inch trees	Tree biomass component					
			Growing-stock trees			Nongrowing-stock trees		
			Stumps	Boles	Tops and limbs	Stumps	Boles	Tops and limbs
Softwoods								
Jack pine	1,146,166	207,154	56,550	724,718	89,207	4,368	57,260	6,909
Red pine	2,526,125	211,432	133,792	1,911,933	229,130	2,381	33,398	4,059
White pine	1,448,491	132,819	65,658	1,042,118	111,819	5,484	81,751	8,842
White spruce	881,134	115,522	49,734	552,469	148,188	1,052	11,152	3,017
Black spruce	929,593	319,558	38,580	422,045	137,790	730	8,228	2,662
Balsam fir	2,290,971	885,360	102,825	966,169	305,285	2,237	22,455	6,640
Hemlock	1,341,005	64,727	70,480	846,386	197,985	10,498	121,533	29,396
Tamarack	364,495	87,036	17,128	210,098	26,296	1,581	19,950	2,406
Eastern redcedar	7,179	1,864	312	3,398	1,097	29	373	106
Northern white-cedar	4,828,192	1,096,023	287,841	2,133,726	636,919	59,816	481,526	132,341
Other softwoods	283,876	62,121	12,939	131,381	40,790	2,505	26,216	7,924
Total softwoods	16,047,227	3,183,616	835,839	8,944,441	1,924,506	90,681	863,842	204,302
Hardwoods								
Select white oak	1,658,729	85,304	87,060	1,023,385	301,978	9,300	120,402	31,300
Other white oak	2,078	134	82	806	294	56	530	176
Select red oak	2,957,552	83,124	142,402	1,931,609	564,442	12,629	174,922	48,424
Other red oak	777,374	28,305	39,784	486,935	144,578	4,720	56,758	16,294
Select hickory	168,196	7,594	7,898	109,866	33,419	452	6,985	1,982
Other hickory	121,100	8,441	5,705	77,217	24,125	262	4,218	1,132
Basswood	1,727,473	79,343	84,967	1,096,475	345,646	6,699	87,890	26,453
Beech	1,056,795	64,460	42,155	555,825	165,233	12,348	169,600	47,174
Yellow birch	1,305,438	91,786	51,460	612,705	191,273	21,134	260,986	76,094
Hard maple	8,377,778	771,328	349,949	4,832,293	1,582,339	41,997	613,126	186,746
Soft maple	7,458,881	849,601	292,530	4,104,462	1,343,400	43,030	634,660	191,198
Elm	754,737	193,676	34,671	343,193	118,692	4,277	45,561	14,667
Black ash	963,402	286,595	42,947	406,973	146,046	5,957	54,949	19,935
White & green ash	1,674,421	200,775	73,100	989,871	312,145	5,155	71,693	21,682
Sycamore	36,532	76	1,363	26,286	6,608	90	1,695	414
Cottonwood	232,100	5,141	13,813	160,497	42,659	631	7,456	1,903
Willow	124,642	4,711	4,788	53,173	14,561	3,055	35,133	9,221
Hackberry	9,901	1,705	540	5,678	1,978	-	-	-
Balsam poplar	695,396	61,767	23,610	426,423	133,048	2,030	37,235	11,283
Bigtooth aspen	2,384,946	231,035	79,077	1,526,473	370,770	7,044	138,772	31,775
Quaking aspen	4,416,647	630,590	154,081	2,453,473	608,104	26,165	442,242	101,992
Paper birch	1,806,977	155,161	75,740	1,026,161	357,706	9,887	136,704	45,618
Tupelo	17,503	2,110	738	7,535	2,638	268	3,181	1,033
Black cherry	1,246,137	149,452	40,645	585,562	193,002	14,346	197,885	65,245
Black walnut	106,979	3,764	4,466	67,182	21,101	519	7,794	2,153
Butternut	23,234	2,673	710	10,752	3,337	267	4,247	1,248
Yellow-poplar	67,215	1,846	2,839	47,829	13,167	58	1,207	269
Sassafras	170,464	48,256	5,886	61,260	21,824	2,199	22,888	8,151
Other hardwoods	127,203	31,374	3,713	38,361	13,754	2,498	28,147	9,356
Total hardwoods	40,469,830	4,080,127	1,666,719	23,068,260	7,077,867	237,073	3,366,866	972,918
Non-commercial species	521,537	291,814	-	-	-	16,202	154,106	59,415
All species	57,038,594	7,555,557	2,502,558	32,012,701	9,002,373	343,956	4,384,814	1,236,635

Table 78. -- All live shrub[1] and tree seedling biomass yields on timberland by species group and forest type, Michigan, 1993

(In pounds per acre green weight)

Species group	Mean for all types	Forest type															
		Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar	Tamarack	Oak-hickory	Elm-ash-soft maple	Maple-beech-birch	Aspen	Paper birch	Balsam poplar	Non-stocked	
Commercial tree species																	
Jack pine	10	336	6	-	-	-	-	-	-	-	-	-	1	-	-	-	
Red pine	-	-	11	-	-	-	-	-	-	-	-	-	-	1	-	-	
White pine	16	1	-	129	-	-	40	-	-	59	-	18	4	-	-	-	
White spruce	15	-	-	14	70	182	-	9	-	-	1	8	29	1	-	-	
Black spruce	58	17	9	53	48	-	814	21	310	-	10	9	28	-	1	-	
Balsam fir	381	18	43	643	1,295	955	261	986	84	12	130	235	437	801	175	-	
Hemlock	25	-	-	14	9	-	-	3	-	-	6	57	-	28	-	-	
Tamarack	6	1	-	-	3	-	63	2	334	-	-	-	-	-	-	-	
Northern white-cedar	120	-	-	4	16	433	30	977	-	-	53	28	3	8	7	-	
Select white oak	3	1	15	1	-	-	-	-	-	34	-	1	1	-	-	-	
Other red oak	-	2	5	-	-	-	-	-	-	-	-	-	-	-	-	-	
Beech	56	1	194	4	-	-	-	-	-	-	-	100	43	-	-	-	
Yellow birch	29	-	1	3	16	-	-	1	-	-	1	69	2	-	-	-	
Hard maple	326	168	96	210	7	12	5	4	-	37	80	697	125	3	4	-	
Soft maple	229	39	132	276	150	57	162	47	114	250	127	242	458	53	85	-	
Elm	92	-	-	-	-	-	-	-	-	-	17	218	12	-	2	-	
Black ash	102	-	3	4	75	23	-	116	-	-	812	71	9	74	467	-	
White & green ash	48	-	-	6	2	42	-	9	-	32	46	80	55	17	33	-	
Cottonwood	3	-	-	-	-	-	-	-	-	-	47	-	-	-	-	-	
Balsam poplar	33	1	-	-	1	-	3	1	-	-	23	21	90	26	1,252	-	
Bigtooth aspen	17	-	22	21	-	-	-	-	-	7	-	6	80	-	-	-	
Quaking aspen	133	138	36	16	2	29	26	1	-	4	5	55	604	115	13	-	
Paper birch	12	-	-	19	1	15	1	3	12	-	-	12	24	207	35	-	
Tupelo	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	
Black cherry	62	28	114	8	18	8	44	4	-	102	8	79	99	4	1	-	
Sassafras	-	-	-	2	-	-	-	-	-	7	-	-	-	-	-	-	
Total	1,776	751	687	1,427	1,713	1,756	1,449	2,184	854	544	1,366	2,007	2,104	1,338	2,075	-	

(Table 78 continued on next page)

(Table 78 continued)

Species group	Mean for all types	Forest type															
		Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar	Tamarack	Oak-hickory	Elm-ash-soft maple	Maple-beech-birch	Aspen	Paper birch	Balsam poplar	Non-stocked
Non-commercial tree species																
Striped maple	5	-	-	-	-	-	-	-	-	-	-	10	4	-	1	-
Mountain maple	62	1	-	1	63	-	48	96	-	-	191	38	116	-	1	-
Ailanthus	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
American hornbeam	8	-	-	-	-	-	-	-	-	-	6	17	5	-	-	-
Apple	-	1	-	-	-	-	-	-	-	-	-	-	-	40	-	-
Hawthorn	2	-	33	-	1	-	-	-	-	1	1	-	3	-	-	-
Eastern hophornbeam	55	-	3	-	-	1	-	22	-	18	73	106	22	-	4	-
Pin cherry	10	2	2	-	-	-	-	-	-	-	-	22	6	-	-	-
Choke cherry	95	15	39	19	19	12	4	49	18	1	69	34	405	14	26	-
Mountain ash	1	-	-	-	-	-	2	-	-	-	-	-	2	-	-	-
Noncommercial willow	5	-	-	-	-	-	-	-	-	-	62	2	-	-	-	-
Total	243	19	77	20	83	13	54	168	18	20	402	229	563	54	32	-
Tall shrub species																
Speckled alder	990	28	-	3,148	3,012	1,610	2,712	1,799	5,135	10	2,519	224	545	129	10,360	-
Swamp birch	3	29	-	-	-	-	26	1	-	-	5	-	-	2	-	-
Dogwood	56	-	-	-	48	1	13	149	228	-	290	19	48	136	237	-
Black alder	42	-	2	-	441	-	60	24	749	-	67	-	46	68	-	-
Sand cherry	1	10	-	-	-	-	-	-	-	-	-	2	-	-	-	-
Witch hazel	13	-	-	-	1	-	-	-	-	19	-	15	34	-	-	-
Juneberry	86	10	31	156	22	17	2	3	49	637	34	67	138	7	49	-
Hazel	113	5	134	149	147	14	12	22	-	-	108	105	264	7	-	-
Buckthorn spp.	7	-	-	-	1	-	112	8	-	-	-	1	-	5	-	-
Leatherwood	39	-	-	-	-	-	-	-	-	1	-	40	137	-	12	-
Viburnum	11	-	1	22	5	1	47	1	76	3	17	12	3	1	14	-
Elderberry	9	-	-	-	-	-	1	-	-	-	6	21	-	-	-	-
Sumac	3	-	-	-	5	-	-	1	-	-	-	5	2	-	-	-
Buffaloberry	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
Russian olive	3	-	-	-	-	-	-	-	-	-	-	8	-	-	-	-
Total	1,376	82	168	3,475	3,682	1,643	2,985	2,008	6,237	670	3,046	519	1,218	355	10,672	-
Low shrub species																
Yew	1	-	-	-	-	-	-	3	-	-	-	2	-	-	3	-
Sweetfern	1	18	6	1	1	-	-	-	-	6	-	-	1	-	-	58
Gooseberry-currant	2	2	-	-	4	2	1	3	-	-	2	1	5	8	16	-
Black huckleberry	-	1	-	6	-	-	-	-	-	1	-	-	1	-	-	-
Blueberry	35	207	70	70	34	14	166	4	64	87	11	10	28	5	-	149
Poison ivy	1	-	-	1	-	-	-	1	-	-	6	-	4	-	7	-
Bearberry	-	5	3	-	-	-	-	-	-	-	-	-	1	-	-	-
Grape	1	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-
Misc. low shrubs	82	86	53	123	58	14	182	69	125	44	70	40	167	135	344	150
Total	123	319	132	201	97	30	349	80	189	138	89	54	208	148	370	357
All species	3,518	1,171	1,064	5,123	5,575	3,442	4,837	4,440	7,298	1,372	4,903	2,809	4,093	1,895	13,149	357

[1] Includes trees less than 1.0 inch d.b.h.

Table 79. -- Sampling errors[1] for Forest Survey Unit and county totals of area of timberland, volume, average net annual growth, and average annual removals on timberland, Michigan, 1993

(Sampling error in percent)

Forest Survey Unit and county	Area	Growing stock			Sawtimber		
		Volume	Average net annual growth	Average annual removals	Volume	Average net annual growth	Average annual removals
Eastern Upper Peninsula							
Alger	2.05	3.37	5.39	16.63	4.63	6.10	16.07
Chippewa	1.67	3.11	4.91	17.67	4.72	5.55	21.52
Delta	1.82	3.42	5.14	17.89	5.45	5.82	21.41
Luce	2.06	3.70	6.28	19.44	5.09	7.11	18.50
Mackinac	1.94	3.55	5.74	20.72	5.43	6.49	26.93
Menominee	1.94	3.71	5.36	20.22	6.24	6.06	26.94
Schoolcraft	1.94	3.72	5.64	20.58	5.41	6.38	22.77
Total	0.72	1.32	2.06	7.12	1.97	2.33	7.95
Western Upper Peninsula							
Baraga	1.66	3.05	5.00	20.62	4.10	4.43	21.86
Dickinson	1.83	3.71	5.32	34.66	5.81	4.90	70.96
Gogebic	1.48	2.88	4.33	27.29	4.21	4.04	31.88
Houghton	1.59	2.95	4.45	25.00	4.14	4.01	28.24
Iron	1.43	2.96	4.41	17.95	4.30	3.92	21.43
Keweenaw	2.60	4.93	8.60	54.39	6.89	7.57	66.03
Marquette	1.15	2.24	3.34	14.25	3.18	3.10	16.67
Ontonagon	1.38	2.70	4.03	20.16	3.87	3.70	24.42
Total	0.54	1.05	1.59	7.68	1.50	1.45	9.05
Northern Lower Peninsula							
Alcona	2.18	5.24	7.12	34.26	6.82	7.63	39.80
Alpena	2.56	6.60	8.68	32.25	8.90	10.70	40.11
Antrim	2.84	6.32	7.95	48.67	8.87	9.91	53.76
Arenac	3.55	9.60	11.89	68.90	12.74	12.85	86.81
Bay	5.94	15.44	18.11	73.59	21.29	18.39	85.52
Benzie	3.34	7.70	9.21	39.57	10.20	11.13	40.88
Charlevoix	2.99	5.98	8.62	33.50	7.58	9.60	37.74
Cheboygan	2.12	5.54	6.98	40.38	7.58	8.66	57.02
Clare	2.49	6.40	8.10	39.41	8.52	9.42	41.71
Crawford	2.29	6.63	8.72	37.19	9.08	9.81	56.90
Emmet	2.78	6.01	7.85	34.80	8.10	8.99	37.80
Gladwin	2.86	7.96	9.49	40.64	10.91	11.33	45.11
Grand Traverse	2.99	7.00	8.63	68.43	9.88	11.66	85.96
Iosco	2.51	6.53	8.64	45.68	8.57	9.16	49.86
Isabella	3.88	9.69	11.55	108.80	12.11	12.46	136.40
Kalkaska	2.39	5.98	7.14	43.02	8.61	9.44	42.09
Lake	2.20	5.51	6.99	28.85	6.89	7.71	40.24
Leelanau	4.16	8.72	10.74	64.27	10.85	12.52	60.36
Manistee	2.48	6.03	7.68	40.33	7.83	9.05	46.05
Mason	3.12	7.55	8.99	45.59	9.91	10.08	56.86
Mecosta	3.06	7.93	8.90	72.43	10.48	11.36	84.10
Midland	2.95	7.62	9.40	57.29	9.90	10.57	91.00
Missaukee	2.58	6.72	7.48	74.30	9.17	10.09	85.33
Montmorency	2.28	6.27	7.94	39.80	8.47	9.51	47.80
Newaygo	2.15	4.97	6.51	26.74	6.08	7.12	29.70
Oceana	2.90	7.41	9.17	43.89	9.60	10.79	44.36
Ogemaw	2.59	6.83	8.13	30.88	9.70	10.46	38.00
Osceola	2.87	7.61	9.26	34.68	9.58	11.16	41.86
Oscoda	2.23	6.56	7.97	31.72	8.29	9.27	42.02
Otsego	2.52	5.95	7.62	32.28	8.58	9.68	36.82
Presque Isle	2.26	5.97	8.17	32.84	8.31	9.84	40.49
Roscommon	2.45	6.16	9.05	39.22	8.02	9.34	43.85
Wexford	2.43	5.69	6.63	31.62	8.12	8.62	43.20
Total	0.46	1.15	1.45	6.89	1.53	1.71	8.14

(Table 79 continued on next page)

(Table 79 continued)

(Sampling error in percent)

Forest Survey Unit and county	Area	Growing stock			Sawtimber		
		Volume	Average net annual growth	Average annual removals	Volume	Average net annual growth	Average annual removals
Southern Lower Peninsula							
Allegan	5.29	8.39	9.70	45.42	10.89	11.13	46.68
Barry	6.70	10.37	12.07	48.78	13.30	13.53	48.86
Berrien	8.63	12.03	13.50	137.86	15.06	15.34	125.98
Branch	9.58	15.16	18.44	126.58	19.66	21.27	160.51
Calhoun	6.72	11.06	12.12	95.55	14.66	14.33	104.60
Cass	8.06	12.34	15.99	164.59	15.61	18.43	321.01
Clinton	9.63	18.66	20.31	-	27.78	24.64	-
Eaton	7.80	13.24	13.34	66.67	18.87	17.76	77.89
Genesee	8.77	16.54	17.92	109.36	21.53	21.88	115.25
Gratiot	10.07	16.83	18.43	64.90	22.71	20.77	63.24
Hillsdale	8.21	15.75	13.92	270.52	20.90	16.95	339.96
Huron	8.80	16.20	16.74	91.86	22.64	19.16	119.90
Ingham	8.97	15.98	16.45	64.99	21.06	19.38	68.38
Ionia	8.18	14.91	14.74	131.63	20.71	20.12	130.36
Jackson	7.79	12.88	15.11	88.43	16.48	17.31	81.93
Kalamazoo	8.16	13.26	14.37	143.53	17.38	19.00	137.47
Kent	5.67	9.80	10.62	56.80	13.06	12.68	64.47
Lapeer	6.76	12.99	12.00	70.45	17.87	15.19	86.27
Lenawee	9.51	14.67	17.33	141.47	19.93	21.38	134.75
Livingston	7.28	12.08	13.22	53.74	14.99	15.58	61.38
Macomb	9.08	19.75	20.82	129.36	26.46	29.19	145.07
Monroe	11.48	17.53	20.42	98.15	22.76	24.83	93.36
Montcalm	6.13	10.45	11.45	35.47	14.07	13.62	41.47
Muskegon	5.59	9.45	11.13	36.50	12.20	12.61	41.63
Oakland	6.70	12.64	13.43	96.00	16.86	17.82	109.61
Ottawa	7.95	13.43	14.41	46.64	17.28	16.98	52.32
Saginaw	7.11	13.30	14.63	93.32	18.59	19.30	203.33
St. Clair	7.99	11.26	12.97	101.49	14.77	15.81	103.49
St. Joseph	8.72	13.99	16.26	88.64	18.13	19.20	86.48
Sanilac	7.91	17.15	16.76	-	27.23	24.07	-
Shiawassee	9.97	14.84	16.58	48.09	18.28	18.46	47.56
Tuscola	6.58	12.65	12.23	48.75	18.61	17.09	63.07
Van Buren	6.39	11.15	12.45	100.34	14.80	14.86	100.84
Washtenaw	7.79	12.90	16.03	66.85	15.69	18.40	86.48
Wayne	12.71	19.77	20.62	97.48	25.43	25.60	106.19
Total	1.29	2.19	2.40	11.85	2.89	2.90	13.07
All counties	0.34	0.67	0.91	4.02	0.94	1.06	4.73

[1]Sampling error is not calculated when the estimated removals is equal to 0.

Table 80. -- Current net annual growth of growing stock on timberland by species group and ownership class, Michigan, 1992

(In thousand cubic feet)

Species group	Total	Ownership class							
		National forest	Other federal	State	County & municipal	Indian	Forest industry	Individual	Corporate
Softwoods									
Jack pine	10,995	4,190	346	4,246	280	-	93	1,371	469
Red pine	82,601	28,007	202	22,517	1,833	-	893	24,655	4,494
White pine	37,266	5,681	105	8,782	474	-	1,656	16,289	4,279
White spruce	26,045	4,942	138	4,353	170	24	2,411	10,702	3,305
Black spruce	3,604	119	6	943	185	5	515	1,157	674
Balsam fir	18,031	2,194	67	2,571	43	13	2,324	8,162	2,657
Hemlock	12,964	1,909	24	1,376	185	32	2,667	4,470	2,301
Tamarack	4,933	381	-	1,405	82	-	576	1,982	507
Eastern redcedar	275	-	-	25	-	-	-	216	34
Northern white-cedar	45,076	4,834	29	11,590	348	75	5,203	18,306	4,691
Other softwoods	7,226	61	-	163	170	-	-	6,392	440
Total softwoods	249,016	52,318	917	57,971	3,770	149	16,338	93,702	23,851
Hardwoods									
Select white oak	20,886	2,509	-	3,632	499	-	87	12,277	1,882
Other white oak	25	-	-	-	-	-	-	25	-
Select red oak	43,554	4,436	43	9,245	645	-	658	24,005	4,522
Other red oak	10,039	2,413	29	1,477	113	-	-	5,538	469
Select hickory	2,075	-	-	114	92	-	-	1,665	204
Other hickory	1,625	-	-	169	23	-	-	1,342	91
Basswood	19,923	2,093	-	3,629	297	27	1,572	10,085	2,220
Beech	14,117	1,652	109	2,049	136	-	1,140	6,840	2,191
Yellow birch	4,231	374	20	536	109	10	1,269	1,317	596
Hard maple	117,018	14,869	158	15,369	1,478	176	18,696	50,298	15,974
Soft maple	114,759	13,316	222	19,264	1,512	80	7,486	59,695	13,184
Elm	17,159	210	-1	1,385	100	1	-158	15,282	340
Black ash	9,757	903	-	1,278	205	56	505	5,885	925
White & green ash	38,385	1,055	9	3,462	630	-	867	28,078	4,284
Sycamore	569	-	-	-	-	-	-	563	6
Cottonwood	4,536	-	-	241	91	-	-	3,586	618
Willow	1,191	9	-	100	15	-	-	977	90
Hackberry	120	-	-	-	-	-	-	120	-
Balsam poplar	7,885	751	-	1,465	-10	16	539	4,427	697
Bigtooth aspen	44,178	3,859	68	12,366	648	11	364	22,898	3,964
Quaking aspen	67,327	7,976	306	14,674	529	33	4,313	32,195	7,301
Paper birch	14,053	1,239	56	2,780	161	8	691	7,345	1,773
Tupelo	311	-	-	38	-	-	-	273	-
Black cherry	14,933	1,172	15	1,986	232	2	323	9,311	1,892
Black walnut	1,570	-	-	137	77	-	-	1,282	74
Butternut	295	3	-	-	-	-	-	261	31
Yellow-poplar	1,086	-	-	42	9	-	-	1,028	7
Sassafras	2,477	6	-	476	43	-	-	1,918	34
Other hardwoods	1,910	-	-	36	67	-	5	1,529	273
Total hardwoods	575,994	58,845	1,034	95,950	7,701	420	38,357	310,045	63,642
All species	825,010	111,163	1,951	153,921	11,471	569	54,695	403,747	87,493

Table 81. -- Current net annual growth of sawtimber on timberland by species group and ownership class, Michigan, 1992

(In thousand board feet)[1]

Species group	Total	Ownership class							
		National forest	Other federal	State	County & municipal	Indian	Forest industry	Individual	Corporate
Softwoods									
Jack pine	52,687	14,809	1,138	25,283	1,412	-	361	6,686	2,998
Red pine	327,633	109,604	740	93,804	6,722	-	3,463	94,008	19,292
White pine	181,389	26,182	594	42,614	2,251	-	9,532	76,271	23,945
White spruce	115,469	17,709	662	18,941	1,453	104	15,339	40,882	20,379
Black spruce	6,349	-1,983	28	3,795	12	-	342	2,289	1,866
Balsam fir	62,869	7,922	382	10,969	554	24	6,741	28,828	7,449
Hemlock	72,106	10,719	140	7,538	1,281	164	15,428	22,925	13,911
Tamarack	20,237	1,618	-	4,493	345	-	2,772	8,476	2,533
Eastern redcedar	427	-	-	-	-	-	-	427	-
Northern white-cedar	153,686	18,088	79	39,400	2,070	65	18,974	57,632	17,378
Other softwoods	22,571	236	-	285	316	-	-	20,349	1,385
Total softwoods	1,015,423	204,904	3,763	247,122	16,416	357	72,952	358,773	111,136
Hardwoods									
Select white oak	89,497	9,244	-	12,213	2,564	-	645	58,230	6,601
Select red oak	213,898	20,683	562	44,661	3,034	-	3,301	120,427	21,230
Other red oak	45,993	9,999	250	5,227	869	-	-	26,465	3,183
Select hickory	8,593	-	-	273	1,342	-	-	6,239	739
Other hickory	6,007	-	-	663	259	-	-	4,780	305
Basswood	87,619	10,171	-	17,371	1,072	129	5,916	42,620	10,340
Beech	60,033	6,242	486	7,907	899	-	5,635	30,186	8,678
Yellow birch	14,026	1,767	163	1,555	484	-1	2,261	4,597	3,200
Hard maple	372,909	42,641	272	45,270	4,737	459	61,079	164,545	53,906
Soft maple	350,782	37,007	332	49,849	4,483	343	26,671	192,763	39,334
Elm	37,818	-111	1	3,913	27	139	-213	33,580	482
Black ash	15,726	2,337	-	1,732	463	2	1,386	7,629	2,177
White & green ash	130,183	5,137	47	10,103	1,924	-	2,612	97,108	13,252
Sycamore	3,090	-	-	-	-	-	-	3,055	35
Cottonwood	22,944	-	-	915	482	-	-	18,591	2,956
Willow	3,990	-	-	678	74	-	-	3,049	189
Hackberry	186	-	-	-	-	-	-	186	-
Balsam poplar	36,757	1,378	-	6,690	18	21	1,581	24,059	3,010
Bigtooth aspen	178,591	10,510	517	37,651	2,712	59	1,442	105,037	20,663
Quaking aspen	252,072	23,195	2,178	46,912	2,038	601	13,979	132,166	31,003
Paper birch	52,702	2,653	307	13,564	357	196	3,443	23,294	8,888
Tupelo	623	-	-	59	-	-	-	564	-
Black cherry	53,707	5,711	323	5,545	998	-	1,851	31,188	8,091
Black walnut	6,270	-	-	261	554	-	-	5,242	213
Butternut	1,901	17	-	-	-	-	-	1,800	84
Yellow-poplar	4,855	-	-	229	48	-	-	4,540	38
Sassafras	4,760	-	-	258	-	-	-	4,392	110
Other hardwoods	4,084	-	1	-	304	-	-	3,779	-
Total hardwoods	2,059,616	188,581	5,439	313,499	29,742	1,948	131,589	1,150,111	238,707
All species	3,075,039	393,485	9,202	560,621	46,158	2,305	204,541	1,508,884	349,843

[1]International 1/4-inch rule.

Table 82. -- Current net annual growth of growing stock on timberland by species group and forest type, Michigan, 1992

(In thousand cubic feet)

Species group	All types	Forest type														
		Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar	Tamarack	Oak-hickory	Elm-ash-soft maple	Maple-beech-birch	Aspen	Paper birch	Balsam poplar	Non-stocked
Softwoods																
Jack pine	10,995	9,272	-246	-43	46	48	329	3	25	601	31	397	515	-2	-	19
Red pine	82,601	4,199	65,550	1,003	362	206	393	75	6	2,846	295	3,434	3,729	463	9	31
White pine	37,266	1,200	3,213	9,980	1,308	381	1,018	1,363	122	3,460	840	10,164	3,617	566	34	-
White spruce	26,045	369	704	551	3,950	5,922	848	248	70	340	915	5,785	5,510	532	290	11
Black spruce	3,604	249	65	-90	696	76	3,401	-1,884	287	-	68	225	527	-23	7	-
Balsam fir	18,031	180	81	42	5,051	319	374	-1,291	217	152	1,564	4,055	5,669	886	732	-
Hemlock	12,964	-	41	60	127	4	44	538	-	106	633	10,929	329	137	16	-
Tamarack	4,933	21	14	12	315	31	1,119	404	2,212	7	310	139	228	52	69	-
Eastern redcedar	275	-	-	-	-	-	-	-	-	125	-	150	-	-	-	-
Northern white-cedar	45,076	12	79	102	1,978	231	823	30,385	547	48	3,210	3,796	2,266	1,043	556	-
Other softwoods	7,226	5,012	399	121	53	112	6	40	-	222	62	1,091	93	15	-	-
Total softwoods	249,016	20,514	69,900	11,738	13,886	7,330	8,355	29,881	3,486	7,907	7,928	40,165	22,483	3,669	1,713	61
Hardwoods																
Select white oak	20,886	111	358	178	-	-	-	4	1	15,260	1,153	3,268	515	38	-	-
Other white oak	25	-	-	-	-	-	-	-	-	-	25	-	-	-	-	-
Select red oak	43,554	722	693	358	58	29	-	41	5	27,094	729	9,292	4,342	179	12	-
Other red oak	10,039	351	337	9	-	-	-	-	-	7,092	393	1,423	386	-	48	-
Select hickory	2,075	9	-	-	-	-	-	-	-	1,194	55	812	5	-	-	-
Other hickory	1,625	34	-2	-	-	-	-	-	-	777	37	779	-	-	-	-
Basswood	19,923	52	19	9	44	1	-	28	-	541	984	17,476	674	92	3	-
Beech	14,117	-	5	2	17	-	-	-	-	319	98	13,409	267	-	-	-
Yellow birch	4,231	2	-	13	49	-1	6	93	-	28	224	3,553	237	26	1	-
Hard maple	117,018	88	293	198	387	95	22	212	-	748	1,009	109,959	3,425	470	112	-
Soft maple	114,759	284	934	463	1,530	276	257	1,301	72	10,050	24,012	61,752	12,299	1,428	101	-
Elm	17,159	-2	34	-	36	-11	-	28	83	1,056	6,290	9,065	478	25	77	-
Black ash	9,757	-	-	11	332	17	5	353	4	125	6,005	2,008	656	38	203	-
White & green ash	38,385	21	48	5	34	8	-	201	72	1,829	10,713	23,775	1,515	124	40	-
Sycamore	569	-	-	-	-	-	-	-	-	19	398	152	-	-	-	-
Cottonwood	4,536	5	-	-	-	-	-	7	-	221	2,928	1,251	110	10	4	-
Willow	1,191	-	7	-	-	3	-	-	-	51	863	222	33	3	9	-
Hackberry	120	-	-	-	-	-	-	-	-	21	47	52	-	-	-	-
Balsam poplar	7,885	140	30	7	353	67	81	-162	41	55	886	801	1,888	577	3,121	-
Bigtooth aspen	44,178	305	661	333	252	8	49	56	5	4,869	1,015	9,054	27,107	390	74	-
Quaking aspen	67,327	551	769	340	2,244	979	957	71	18	1,265	3,056	14,129	41,452	906	580	10
Paper birch	14,053	43	87	155	1,265	357	209	196	75	392	1,033	3,860	3,486	2,754	141	-
Tupelo	311	-	-	-	-	-	-	-	-	80	172	34	14	11	-	-
Black cherry	14,933	179	211	69	87	29	16	17	11	1,846	788	10,337	1,251	80	12	-
Black walnut	1,570	-	4	-	-	-	-	-	-	706	35	825	-	-	-	-
Butternut	295	-	-	-	-	-	-	8	-	105	32	150	-	-	-	-
Yellow-poplar	1,086	11	4	-	-	-	-	-	-	93	162	816	-	-	-	-
Sassafras	2,477	70	-	-	-	-	-	-	-	536	53	1,804	14	-	-	-
Other hardwoods	1,910	-	56	-	1	-	-	-	-	302	654	839	45	-	13	-
Total hardwoods	575,994	2,976	4,548	2,150	6,689	1,857	1,602	2,454	387	76,674	63,849	300,897	100,199	7,151	4,551	10
All species	825,010	23,490	74,448	13,888	20,575	9,187	9,957	32,335	3,873	84,581	71,777	341,062	122,682	10,820	6,264	71

Table 83. -- Current net annual growth of sawtimber on timberland by species group and forest type, Michigan, 1992

(In thousand board feet)[1]

Species group	All types	Forest type														
		Jack pine	Red pine	White pine	Balsam fir	White spruce	Black spruce	Northern white-cedar	Tamarack	Oak-hickory	Elm-ash-soft maple	Maple-beech-birch	Aspen	Paper birch	Balsam poplar	Non-stocked
Softwoods																
Jack pine	52,687	43,443	2,071	760	182	218	30	-	33	2,898	414	742	1,628	3	-	265
Red pine	327,633	17,285	255,587	5,297	2,641	273	1,955	363	34	9,445	1,348	15,720	16,505	954	53	173
White pine	181,389	5,903	16,378	48,771	7,026	2,322	5,573	7,604	1,041	12,165	5,007	49,465	16,567	3,403	164	-
White spruce	115,469	1,610	3,818	2,158	19,203	11,899	4,939	3,330	222	640	4,651	27,909	31,603	2,195	1,292	-
Black spruce	6,349	-22	234	-54	2,287	1,042	5,066	-4,719	99	-	476	511	1,333	8	88	-
Balsam fir	62,869	128	350	289	14,827	686	1,443	-2,662	433	312	5,055	14,341	20,676	4,058	2,933	-
Hemlock	72,106	-	209	229	500	26	310	2,043	-	312	2,970	62,774	1,440	1,130	163	-
Tamarack	20,237	36	81	17	1,841	95	3,967	1,854	9,034	-	940	1,063	689	184	436	-
Eastern redcedar	427	-	-	-	-	-	-	-	-	358	-	69	-	-	-	-
Northern white-cedar	153,686	17	237	879	6,289	811	1,972	94,424	838	71	12,336	20,603	9,119	2,953	3,137	-
Other softwoods	22,571	13,165	1,696	107	635	739	-	-	-	738	166	4,700	551	74	-	-
Total softwoods	1,015,423	81,565	280,661	58,453	55,431	18,111	25,255	102,237	11,734	26,939	33,363	197,897	100,111	14,962	8,266	438
Hardwoods																
Select white oak	89,497	280	961	700	-	-	-	-	-	65,642	5,979	13,940	1,851	144	-	-
Select red oak	213,898	2,780	3,878	1,780	135	18	-	-	29	140,428	2,720	43,517	17,588	958	67	-
Other red oak	45,993	1,712	1,479	233	-	-	-	-	-	33,000	1,899	6,073	1,400	-	197	-
Select hickory	8,593	-	-	-	-	-	-	-	-	5,502	144	2,947	-	-	-	-
Other hickory	6,007	167	-	-	-	-	-	-	-	2,545	94	3,201	-	-	-	-
Basswood	87,619	113	41	19	144	5	-	175	-	971	2,989	80,320	2,702	140	-	-
Beech	60,033	-	32	-	41	-	-	-	-	1,410	544	57,144	862	-	-	-
Yellow birch	14,026	10	-	-3	388	-1	-	518	3	50	454	12,164	438	-1	6	-
Hard maple	372,909	95	328	731	637	147	-	975	-	3,097	1,808	358,214	5,429	1,400	48	-
Soft maple	350,782	237	1,766	1,203	3,758	531	280	7,544	42	23,755	79,560	202,374	26,034	3,254	444	-
Elm	37,818	1	-	-	-44	-37	-	47	19	2,724	13,778	19,993	1,036	309	-8	-
Black ash	15,726	-	-	38	453	-	-	75	-	52	9,608	4,743	641	39	77	-
White & green ash	130,183	110	129	10	-	13	-	764	-	6,628	29,988	88,401	3,808	274	58	-
Sycamore	3,090	-	-	-	-	-	-	-	-	108	2,317	665	-	-	-	-
Cottonwood	22,944	24	-	-	-	-	-	41	-	1,273	14,561	6,131	893	-	21	-
Willow	3,990	-	-	-	-	14	-	-	-	36	3,126	761	35	18	-	-
Hackberry	186	-	-	-	-	-	-	-	-	-	146	40	-	-	-	-
Balsam poplar	36,757	334	22	62	1,224	131	31	2,886	209	175	3,137	2,095	10,699	2,583	13,169	-
Bigtooth aspen	178,591	153	2,768	1,406	1,260	50	698	616	25	26,290	4,616	31,779	106,680	2,180	70	-
Quaking aspen	252,072	2,327	4,072	1,832	8,002	3,283	1,006	944	63	4,891	13,292	56,063	146,987	6,725	2,585	-
Paper birch	52,702	51	227	622	2,867	971	393	1,918	348	1,666	4,132	12,424	12,855	13,414	814	-
Tupelo	623	-	-	-	-	-	-	-	-	389	175	-	-	59	-	-
Black cherry	53,707	871	90	5	814	209	-	228	23	7,523	1,663	39,683	2,506	18	74	-
Black walnut	6,270	-	20	-	-	-	-	-	-	2,225	122	3,903	-	-	-	-
Butternut	1,901	-	-	-	-	-	-	43	-	190	65	1,603	-	-	-	-
Yellow-poplar	4,855	58	-	-	-	-	-	-	-	505	654	3,638	-	-	-	-
Sassafras	4,760	174	-	-	-	-	-	-	-	1,801	436	2,309	40	-	-	-
Other hardwoods	4,084	-	-	-	-	-	-	-	-	88	1,359	2,637	-	-	-	-
Total hardwoods	2,059,616	9,497	15,813	8,638	19,679	5,334	2,408	16,774	761	332,964	199,366	1,056,762	342,484	31,514	17,622	-
All species	3,075,039	91,062	296,474	67,091	75,110	23,445	27,663	119,011	12,495	359,903	232,729	1,254,659	442,595	46,476	25,888	438

[1] International 1/4-inch rule.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1996 -- 756 - 572 / 20092

Leatherberry, Earl C.; Spencer, John S., Jr.
1996. **Michigan forest statistics, 1993.** Resour. Bull. NC-170. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 144 p.

The fifth inventory of Michigan's forests reports 36.4 million acres of land, of which 19.3 million acres are forested. This bulletin presents statistical highlights and contains detailed tables of forest area, as well as timber volume, growth, removals, mortality, and biomass.

KEY WORDS: Forest area, timber volume, growth, removals, mortality.

Our job at the North Central Forest Experiment Station is discovering and creating new knowledge and technology in the field of natural resources and conveying this information to the people who can use it. As a new generation of forests emerges in our region, managers are confronted with two unique challenges: (1) Dealing with the great diversity in composition, quality, and ownership of the forests, and (2) Reconciling the conflicting demands of the people who use them. Helping the forest manager meet these challenges while protecting the environment is what research at North Central is all about.